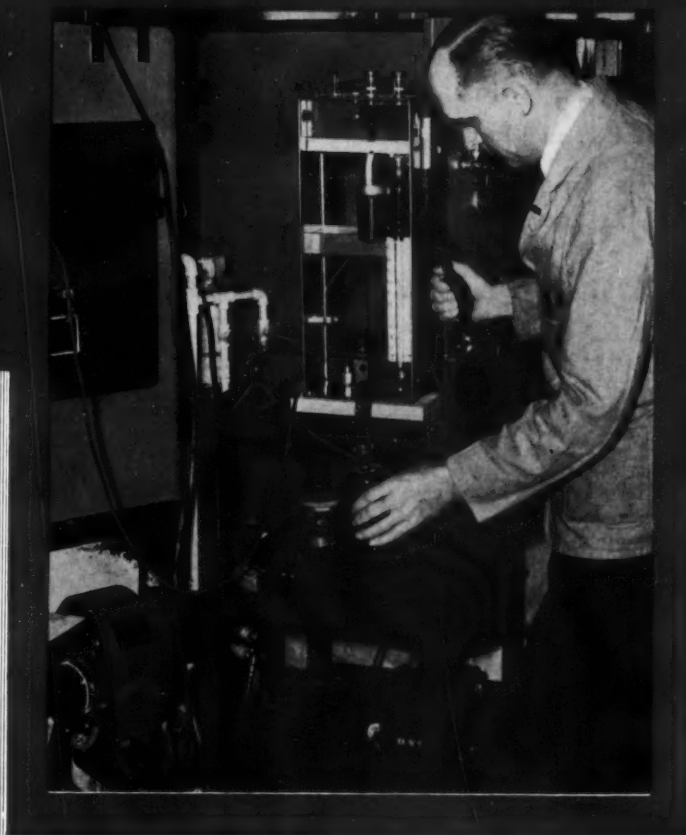


AMERICAN ARTISAN

FEBRUARY
1941



RESIDENTIAL AIR CONDITIONING
WARM AIR HEATING • SHEET METAL CONTRACTING

ESTABLISHED
1 8 8 0

Here's Your Own

**4 POINT PROGRAM
FOR**



**NATIONAL
DEFENSE**

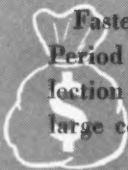
**RESIDENTIAL BUILDING—PUBLIC AND PRIVATE—IS OF
VITAL IMPORTANCE TO NATIONAL DEFENSE**

The LAMNECK SYSTEM of Prefabricated Duct and Fittings Lets You Continue Your Regular Business and Yet Add to Your Capacity and Take Your Share of the National Defense Housing.



With Lamneck, available man power accomplishes more by confining itself exclusively to installation.

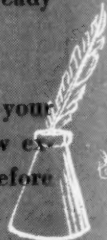
Don't let today's volume scare you . . . bid for more shop capacity. Handle these jobs on time, because volume will equal your installation crew man hours . . . by using the factory-backed stock of your nearby Lamneck Distributor.



Faster turnover of capital is possible with Lamneck. Period is shorter between purchase of material and collection of your pay. You do not have to anticipate the large contract because of limited capital capacity. Re-

member you do not buy Lamneck until you are ready to install.

With Lamneck you can always figure in advance your definite costs . . . naturally then, you always know exactly where you stand. Your profit is *known* before you bid.



WRITE US TODAY

for the name of your nearest LAMNECK Distributor, who will clearly and concisely explain every detail.

Specify

LAMNECK

LAMNECK PRODUCTS INC. Middletown, Ohio

Simplified Furnace Pipe and Fittings and Prefabricated Duct and Fittings for all Types of Residential Gravity and Forced Warm Air Heating and Air Conditioning Systems.

THE AUER "7000"
AIRO-FLEX
AIR CONDITIONING REGISTER *is the*
SUPER REGISTER
for a quality **WARM AIR JOB!**



*Adjustable
for
UP and DOWN
FLOW*

A good heating unit deserves a good register. The contractor who installs a high-grade furnace cannot afford to risk the loss of the entire effect of his job by using an inefficient register. Numerous warm air and air conditioning jobs today require, for efficient operation, a baseboard or wall register providing a range of downward directional flow from 15° to 22°.

Substantially built, nicely finished, furnished with sponge rubber gaskets for wall use—the "7000" represents the minimum economy register consistent with good heating practice. Compare "7000" prices with those of any other register and see for yourself.

The ideal economy register for this purpose is the Auer "7000" Airo-Flex. With grille bars easily adjustable for required angles up, straight, or down, this Airo-Flex is a single louvre register of simple construction, without complicated parts or installation problems. Costing only a trifle more than the most inexpensive register, its efficient directional principle makes all the difference in the world on many jobs—to say nothing of its better appearance, far outclassing the ordinary competitive product.

THE AUER REGISTER COMPANY, 3608 PAYNE AVE., CLEVELAND, O.

Ask for complete Auer Register Book 40, and name of your nearest Auer distributor. Separate Catalog "G" also available on Auer Grilles.

AUER REGISTERS
& GRILLES · For Air Conditioning and Gravity

AMERICAN ARTISAN

Covering All Activities in Residential Air Conditioning and Small Commercial Cooling, Warm Air Heating, Sheet Metal Contracting and Fabricating

WITH WHICH ARE MERGED

FURNACES
AND
SHEET METALS

AND

Warm-Air
Heating

J. D. Wilder, Editor

A. A. Kennedy, Assistant Editor

Vol. 110, No. 2 February, 1941 Founded 1880

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In This Issue

THIS month's cover picture shows oil burner testing in the Underwriters' Laboratory. Beginning a few weeks ago, the Laboratory now adds a new label indicating that the burner has been tested in the field. This step was taken to insure operation satisfactory under actual installation conditions. Contractors will want their burners to bear this new label to safeguard installation.

In 1941 the warm air heating industry looks to defense housing as a market for at least 200,000 new furnace installations in houses built for defense civilian workers. Arnold Kruckman, on page 42, describes the houses and heating plants and tells where these houses will be built and in what number.

If you are seeking legitimate means of lowering your taxes for 1940 read the 20 suggestions for keeping your taxes at a minimum on page 44.

If the Certified Quality Code of Peoples Gas Light & Coke Co., Chicago (published in the January issue) was of interest see page 58 for a description of the Certificates issued to the manufacturer to prove to the dealer that his furnace has been CQ approved and the Certificate the contractor gives the home owner to show that both furnace and installation meets CQ recommendations. This is the "teeth" of the CQ code.

We like to publish descriptions of fleches—they are such beautiful examples of the highest qualities in sheet metal craftsmanship. The most imposing fleche of 1940 is described on page 75.

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More than 8,000 copies of this issue are being distributed

I'd rather wear Gloves!



TOMMY, IT'S NEARLY TIME FOR THE PARTY. HAVE YOU WASHED YOUR HANDS?

AW, SHUCKS! WHY DO I HAVE TO WASH? CAN'T I WEAR GLOVES?



WHEN it comes to cleaning up, one guy that can't get away with anythin' is the owner of a seafood plant . . . which makes him one swell prospect!



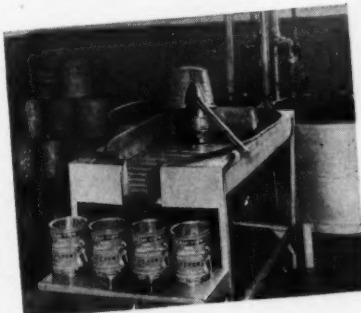
1 Every piece of equipment in a seafood plant has to pass sanitary inspection . . . an' I don't mean maybe! It has to be easy to clean an' rust is *out* . . . fish scale, brine an' such are no excuse. So the owner had this fish washing tank lined with Monel...a sweet little job for some sheet metal man, an' plenty more like it in shore plants. For instance:



3 The linin' for this glazin' pot is another good bet, also the pans that carry the fish...they're Monel, too. No need to worry about one wearin' out the other, because Monel is plenty tough. Still, Monel is easy to work an' weld, an' also solder... so there's a nice margin for you in every job.

Tim Shears

2 There's plenty of jobs in these places where Monel is rated tops. No trouble gettin' orders for oyster skimmers, tubs, an' dippers, when you tell the owner you know how to handle Monel. Bein' a cinch to work, this metal takes less hours of labor an' gives you a bigger profit.



THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.



GIVE YOUR
CUSTOMERS REAL HEATING
SATISFACTION... AND
EARN AN EXTRA PROFIT



...by featuring the
MUELLER
Series 50
oil-fired winter air
conditioning furnace

For a successful furnace business, you should go after your full share of the automatic heating jobs in your community.

You can sell these extra-profit, extra-prestige jobs — with confidence that your equipment is second-to-none—when you are backed up by the *complete* Mueller line.

For example, look at the selling points of the Mueller Series 50 oil-fired unit:

Economy with a furnace *designed to burn oil*...equipped with a Mueller pressure atomizing, or vaporizing oil burner... low enough in cost for moderate-priced homes. (Available without burner if desired.)

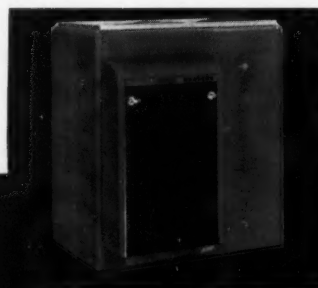
Comfort—Healthfulness with winter air conditioning — built into the furnace. Clean, filtered, humidified warmth uniformly circulated to every room.

Prestige — The eye-appeal of Mueller's handsome designs, the name appeal of this 84-year old nationally advertised line — the most complete in the industry.

For a big 1941, "go Mueller" all the way. Mueller has nation-wide distribution. If you are not acquainted with the Mueller distributor in your territory, write us. Literature and complete information furnished on request. L. J. Mueller Furnace Company, 2010 West Oklahoma Avenue, Milwaukee, Wisconsin.

D-2A

Gas SERIES EPS Gas-fired Winter Air Conditioning Furnace. Thrifty comfort for all homes—and a simple installation. →



Coal SERIES FB Cast Iron Furnace with Winter Air Conditioning. Modern styling. Dependable, economical performance. Also available in gravity style.

MUELLER *Milwaukee* 
HEATING AND AIR CONDITIONING

*Mueller will
shortly announce a
vertical vaporizing
oil-fired furnace.
Watch for it!*

A BLUE RIBBON WINNER *in Every Detail!*



**ATTRACTIVE
APPEARANCE
LARGE FREE AREA
NEW METALUSTRE
FINISH
LOW RESISTANCE
ADJUSTABLE FINS
EXCELLENT AS
REPLACEMENT
REGISTER**



The NEW **H&C** No. 130 SERIES

Ready for Shipment in March

- *Attractive Appearance*—modern as today, yet sufficiently conservative and inconspicuous to appeal to everyone.
- *New Metalustre Finish*—a rich brown lacquer finish in excellent good taste, attractively priced in Group I (the same price as Black Japan finish).
- *Large Free Area*—approximately 80%, which means that size 12 x 8 can be used on a 10" pipe.
- *Low Resistance*—Exhaustive tests conclusively prove the resistance of No. 130 to be considerably less than that of the conventional registers of this type, due to the fact that the fins are perpendicular to the face. Low resistance means high efficiency.
- *Adjustability*—Fins may be adjusted up or down as desired with key furnished.
- *Excellent as Replacement Register*—Whenever an existing gravity installation is to be changed to air conditioning. New valve mechanism holds securely in any position even when used with air conditioning. Never requires adjustment.
- **IMPORTANT**—The overall dimensions of No. 130 Series Registers are identical with those of all other Hart & Cooley Gravity Baseboard Registers, making replacement a simple matter.

**SIDEWALL
REGISTERS
AND RETURN
AIR INTAKES
TO MATCH**



**TURNING
THE FINS**

**BE SURE TO SEE THIS NEW LINE BEFORE PLACING
YOUR STOCK ORDER—YOUR JOBBER HAS SAMPLES.**

HART & COOLEY MANUFACTURING CO.

Warm Air Registers • Air Conditioning Grilles • Damper Regulator Sets • Dampers • Chain • Pulleys

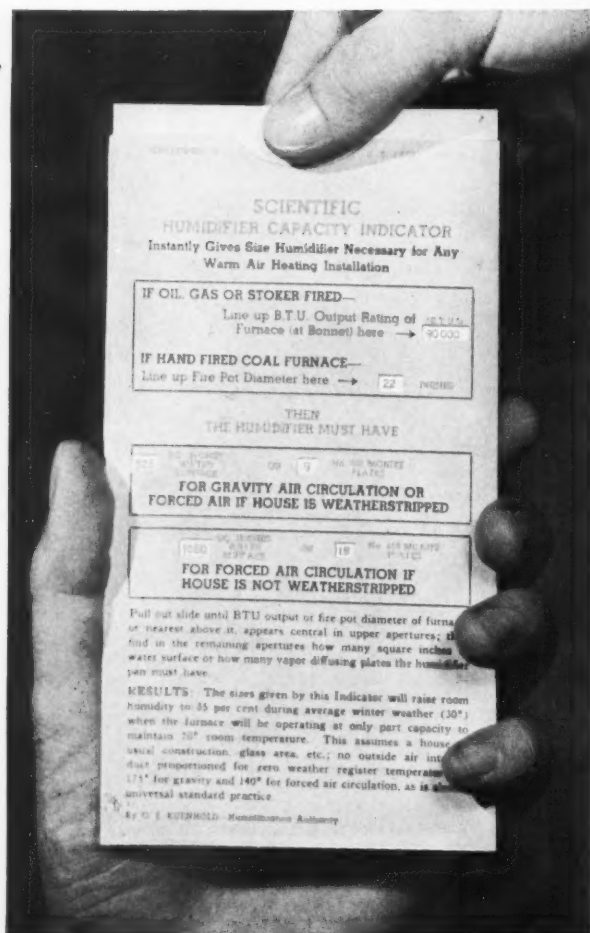
FACTORY AND ENGINEERING SALES OFFICE:

HOLLAND  MICHIGAN

Chicago Office: 61 W. Kinzie St. Philadelphia Office: 1600 Arch St.

MONEY CAN'T BUY IT!

But You Can Have It FREE



MAKES YOU AN EXPERT OVERNIGHT!

This handy little calculator tells you accurately and instantly how much humidification is required for any job. Easy to use and easy to understand. Your work requires that you **know** how much water-surface or equivalent evaporation is needed for proper humidification of a given home. Now—for the first time—you **can** know, and all it costs you is the postage stamp that brings us your request. Don't delay. Write us today.

How many times have you wished for a dependable formula to determine the humidification requirements of a given job? And there was no way of solving the problem. Nobody **knew** what the requirements were. All you could do was to cross your fingers and hope you were guessing right.

Those days are gone. Monmouth engineers have developed an **automatic** capacity indicator that tells you instantly how many square inches of evaporating surface are needed.

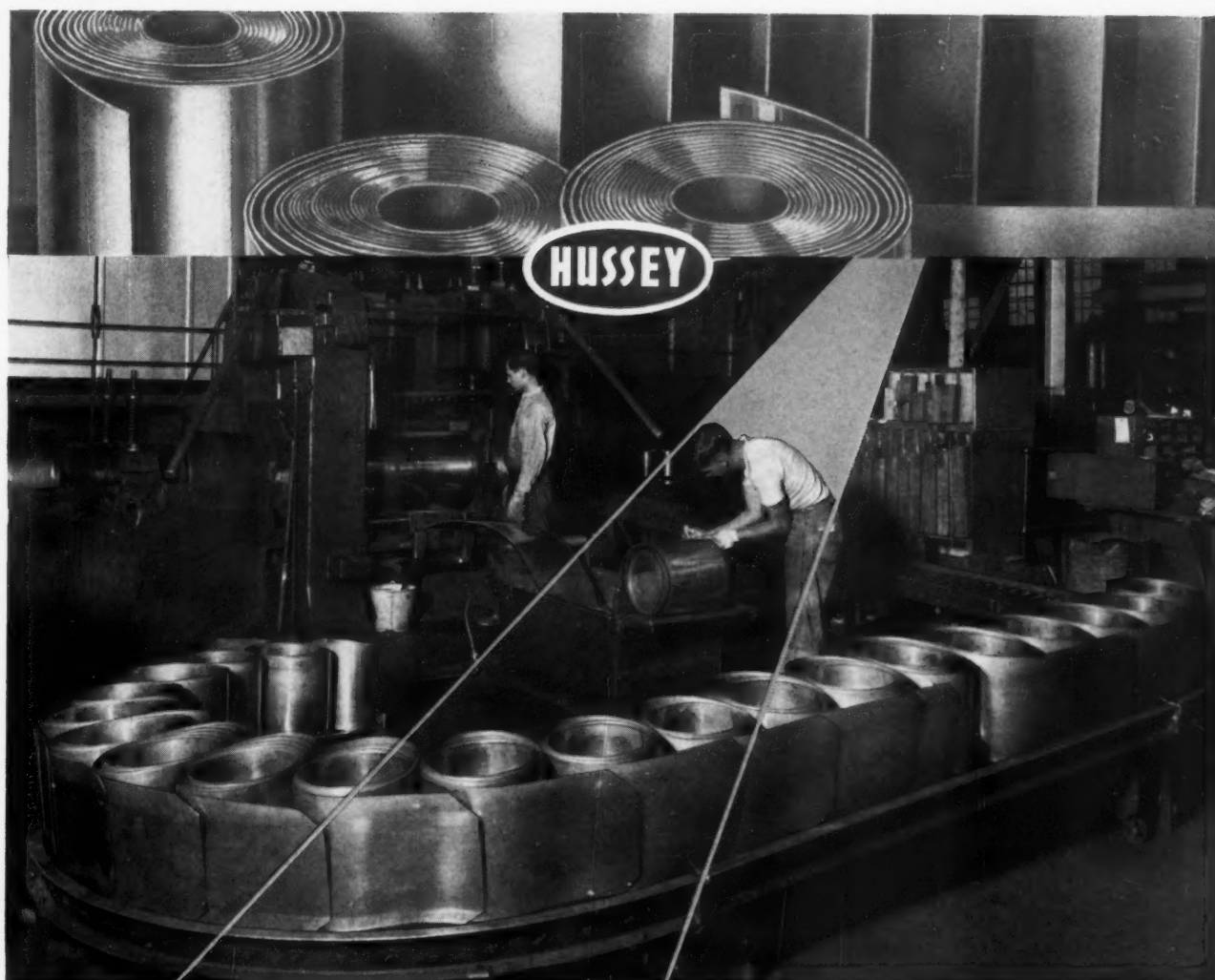
These handy instruments are not for sale. But they are being presented to every heating man who sends in a proper request. If you have not written for yours, do so today. The Monmouth Capacity Indicator ends, for all time, the guess-work that has always been the bug-bear of domestic humidification.

Many years of scientific study and patient research are wrapped up in this pocket-size instant calculator. No one else has ever attempted to reduce humidification to such a simple, fool-proof, yet entirely scientific basis. Write us today on your business letterhead and your Monmouth Capacity Indicator will be sent entirely without charge.

MONMOUTH PRODUCTS CO.
1933 East 61st Street Cleveland, Ohio

MONMOUTH

The Greatest Name in Humidification



"KEEN EYES"

SERVE YOU...

PROBING EVERY STEP IN THE MANUFACTURE OF HUSSEY COPPER

Protecting your interests are the keen eyes of inspection throughout every manufacturing process in the making of Hussey Copper. Strict purity control, hundreds of visual inspections and high precision gauging keep constant check on quality and accuracy—so that you will have trouble-free operations when you use Hussey Copper.

Hussey Copper costs you no more—why not have this added protection working for you? There is a complete Hussey Warehouse Stock near you ready to serve your copper needs promptly.

HUSSEY COPPER AND BRASS PRODUCTS

Sheets
 Coils
 Bars
 Rolled Shapes
 Extruded Shapes
 Pipe
 Tubing
 Tubes
 Wire
 Nails
 Roof Drainage
 Supplies
 Fabricated Specialties

C. G. HUSSEY & COMPANY

(Division of Copper Range Co.)

Rolling Mills and General Offices: PITTSBURGH, PA.
WAREHOUSES IN PRINCIPAL CITIES

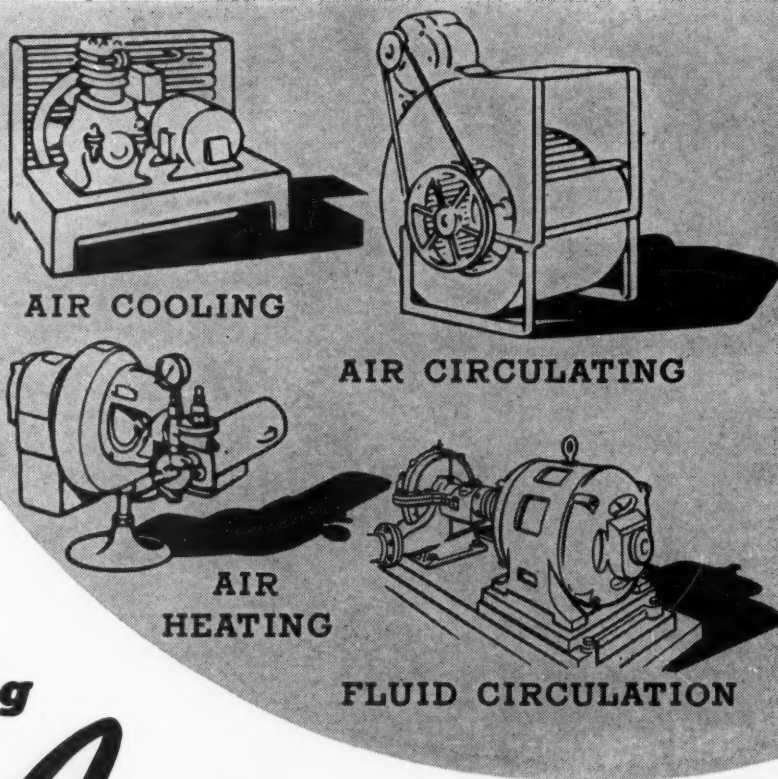


**Balance the
Demands of
Air Conditioning
with**

CENTURY

Job Selected

MOTORS



These special data units will help you select the correct type of motor for your specialized demands:

Form 044A—Split Phase Motors for Every Split Phase Application $\frac{1}{8}$, $\frac{1}{4}$, $\frac{1}{2}$ horsepower.

Form 938A—Repulsion Start Induction Brush Lifting Single Phase Motors $\frac{1}{8}$ to 40 horsepower.

Form 046A—Squirrel Cage Induction Motors $\frac{1}{8}$ to 600 horsepower.

Form 6-1—Splash Proof Motors $\frac{1}{2}$ to 100 horsepower.

Form 1032—Slip Ring Motors 1 to 350 horsepower.

Form 1033—Direct Current Motors 1 to 300 horsepower.

Form 0411—Capacitor Single Phase Motors $\frac{1}{8}$ to 20 horsepower.

Form 0412—Totally enclosed Fan Cooled Squirrel Cage Motors.



In the field of air conditioning there are four widely different uses of electric motor drives. The demands of air cooling, air heating, air circulating and fluid pumping each present a specialized operating problem that only the *right* motor can best solve.

The power and operating demands of your machine or job determine which Century Motor is best for your application. Because of Century's wide range of motor types and sizes up to 600 horsepower, Century offers you the correct *Job Selected* Motor to properly balance the requirements of practically any application. You'll find Century Job Selected Motors assure you and your customers peak performance, maximum economy and satisfactory operation.

Call in your Century Motor Specialist and find out all the advantages of balancing your jobs with Century Job Selected Motors.

CENTURY ELECTRIC COMPANY

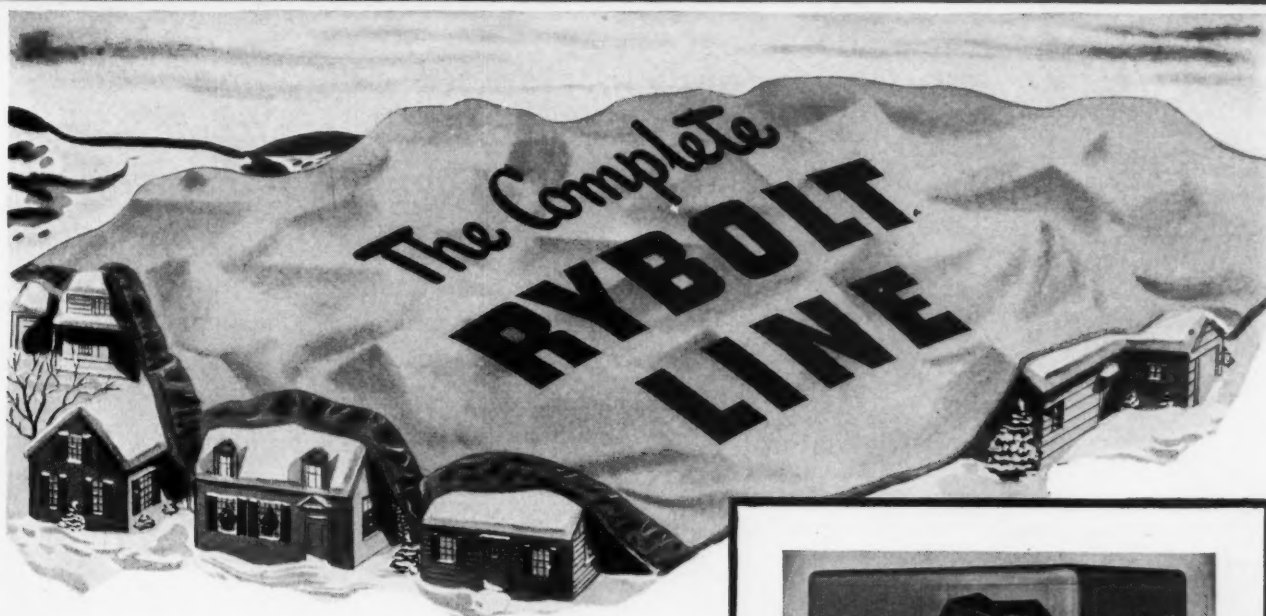
1806 Pine Street St. Louis, Missouri

Offices and Stock Points in Principal Cities



One of the Largest Exclusive Motor and Generator Manufacturers in the World

RYBOLT



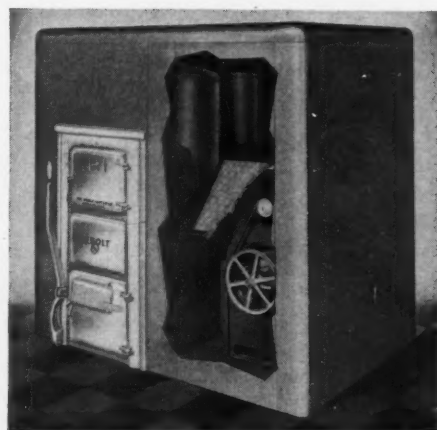
covers every heating need like a blanket

• Sales dominance in the residential heating field depends principally on having what every customer needs and wants to take care of his particular requirements.

The RYBOLT *complete* line covers every residential heating need like a blanket. For every house, large or small—for every fuel, coal, gas or oil—for every family budget—there's a RYBOLT heating unit that will meet the situation to the customer's entire satisfaction. This versatility of the RYBOLT line gives the dealer decided competitive advantages as it enables him to concentrate and simplify his buying, his advertising, his selling and his service.



WRITE FOR *Folders describing and illustrating the Complete RYBOLT line of Furnaces and Winter Air Conditioners*



RYBOLT STEEL COAL-FIRED WINTER AIR CONDITIONER • Series 4200

This RYBOLT unit is thoroughly modernized, smartly styled and moderately priced. It has every advanced feature required for efficient, convenient and economical automatic heating. A special feature is the full height reversible blower cabinet which can be placed on either side of the unit. Compact and dignified in design, the cabinet is handsomely finished in lustrous gray Hammerloid enamel. The Gravity Furnace, Series 4000, with the same steel heating unit can be furnished with either round or square casing. Easily adaptable for stoker firing.

THE RYBOLT HEATER COMPANY
615 MILLER STREET • ASHLAND, OHIO

Modern construction *demands* through-wall flashing!

Tendency toward damaging water pockets economically overcome with Anaconda Through-Wall Flashing

Because of the reduction in thickness of exterior walls, wind-driven rain and moisture frequently enter the structure to damage ceilings and walls. To prevent this, through-wall flashing was devised.

Anaconda Through-Wall Flashing is widely used because:

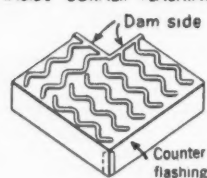
- 1 It provides drainage in any desired direction.
- 2 It drains itself dry on a level bed, reducing possibility of wet walls and heaving by frost.
- 3 Its $\frac{7}{32}$ " high zig-zag corrugations provide complete bond with mortar in all lateral directions.

Anaconda Through-Wall Flashing made of 16-oz. copper and furnished in various widths and selvages, is efficient, positive and durable, *yet relatively inexpensive*. It is readily adaptable to practically every masonry condition. For the complete story, ask for Publication C-28.

4164

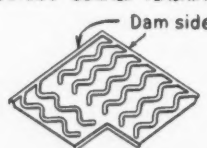
Anaconda Through-Wall Flashing being installed on Ketcham School, Washington, D. C., Nathan C. Wyeth, Municipal Architect. General Contractor: John W. Hunt Co.; Sheet Metal Contractor: The Mathy Co., both of Washington, D. C. Flashing was supplied by York Corrugating Co.

INSIDE CORNER FLASHING



Standard inside corner flashing unit.
Dam on inside, drains out.

OUTSIDE CORNER FLASHING



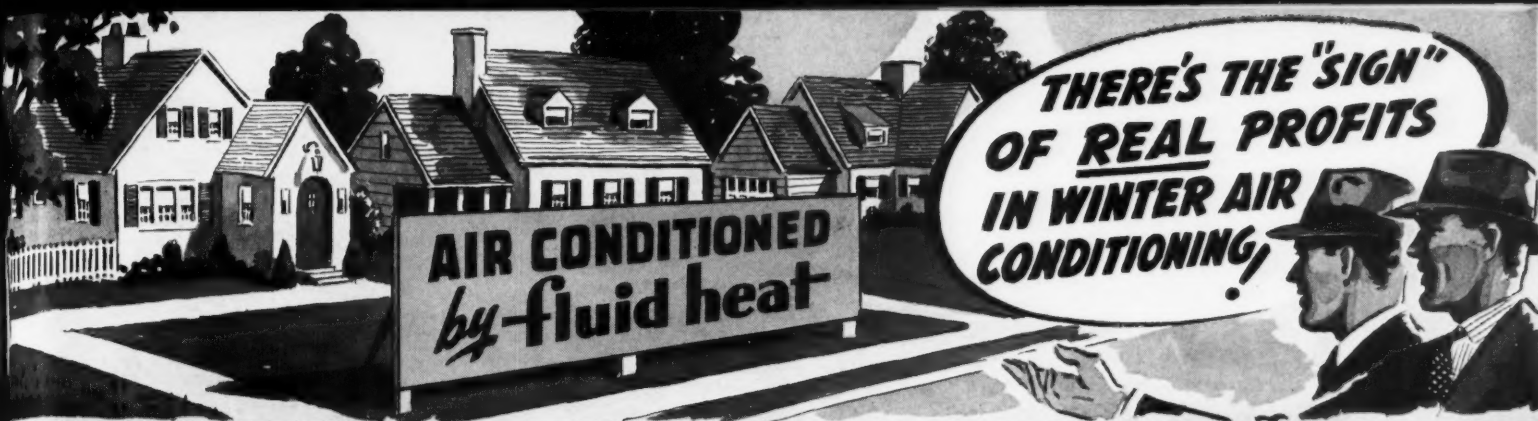
Standard outside corner flashing unit.
Dam on outside, drains in.



Anaconda Copper

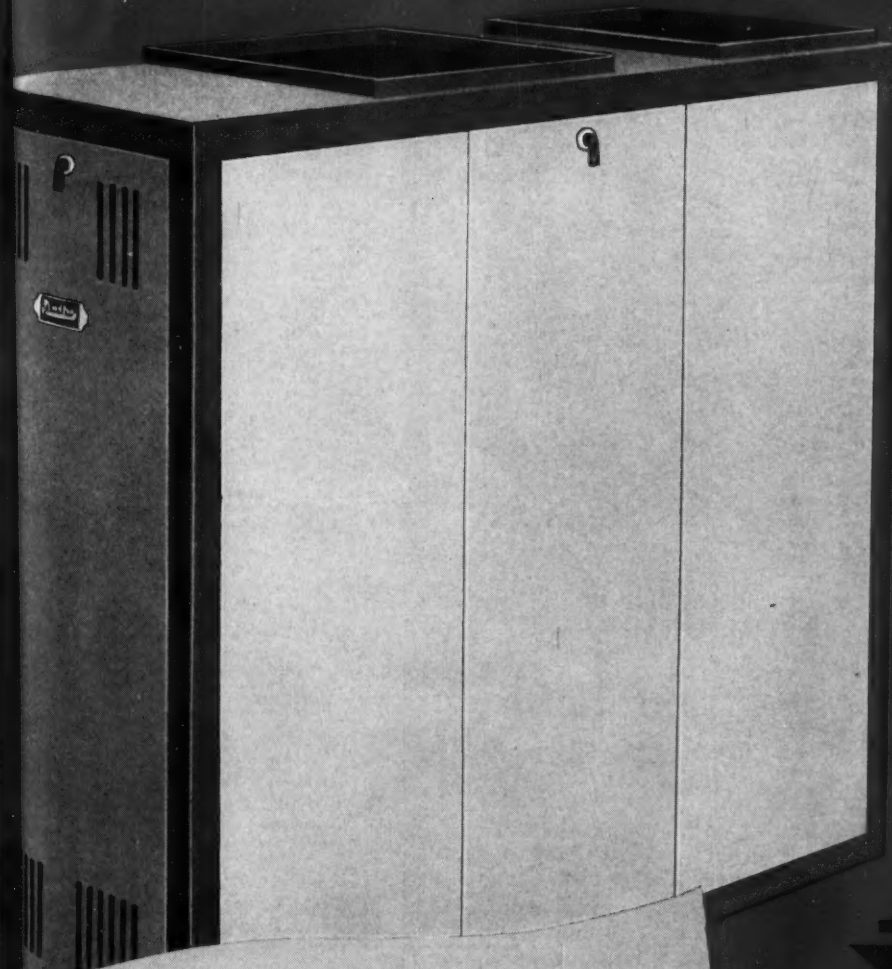
THE AMERICAN BRASS COMPANY, General Offices: Waterbury, Connecticut

In Canada: Anaconda American Brass Ltd., New Toronto, Ontario • Subsidiary of Anaconda Copper Mining Company



MASS PRODUCTION . . .

Opens MASS MARKETS for Air Conditioning



No longer is Winter Air Conditioning a slow-selling luxury! With the introduction of the new Fluid Heat FHA Type Air Conditioners, Fluid Heat has stepped Air Conditioning into the position it took the oil burner industry years to obtain. For these FHA Air Conditioners introduce *mass-production* with its ability to produce quality units at popular price, to the small-home market.

Fluid Heat has installed a modern production line, buys copper-bearing steel plate on contract from one of the world's largest steel mills nearby—has installed new, high-speed jigs and welding machinery. Specially-built Infra-Red Dryers to bake enamel on the jackets and much other special equipment in order to take full advantage of the miracles of modern mass-production.

That's why Fluid Heat Dealers everywhere are cashing in big on these new FHA Type Air Conditioners. They're quality-built units, with savings made in manufacturing—not in materials. They offer many finer features—many firsts in the field. Check the list of "knock-out" sales features—and see why they represent the most salable Conditioner in the heating industry today. Then mail the coupon—and get FULL DETAILS. Your territory may still be open—BUT ACT QUICKLY!

CAST YOUR EYE ON THESE KNOCK-OUT SALES FEATURES!

- BURNER AND FURNACE engineered as a unit—built in the same plant. Not an assembled "job."
- JACKETS AND BURNERS finished in "hammered" gray, hard-baked by the Infra-Red process which revolutionized automobile finishes.
- BURNER approved for firing rates of 7/10 to 3 G.P.H. by Underwriters' Laboratories under U. S. Commercial Standards CS75-39.
- CAPACITIES from 80,000 to 215,000 B.T.U. at Bonnet.
- SPECIAL UNIT-BUILT Combustion Chamber and heavy steel plate Furnace.
- SPUN GLASS FILTERS of highly efficient design.
- QUIET BLOWERS of ample capacity.

fluid heat

AIR CONDITIONER

"World's Economy Champion"

A PRODUCT OF THE ANCHOR POST FENCE COMPANY,
BALTIMORE, MD., ESTABLISHED 1902

FLUID HEAT DIVISION, Anchor Post Fence Co.
6727 Eastern Avenue, Baltimore, Maryland.

Please send me at once details of the Fluid Heat Air Conditioners and the complete Fluid Heat Line.

Name.....

Firm.....

Address.....

City.....State.....

"This week we placed several orders with you, all of which arrived at our plant the following morning, almost before our men had started to work. We wish to thank those in your organization responsible for this fine attention to the business we place with you."

FROM LETTER RECEIVED BY
SCULLY CHICAGO WAREHOUSE



Imagine being thanked for attending to business!

CUSTOMERS are frequently surprised at our speed in delivering orders. Sometimes, when there is an emergency, we seem to do the impossible. But each Scully Warehouse operates on the basis that all customers always want immediate shipment and friendly consideration. Fast service is the rule at Scully — not the exception. Right now, whether or not you are working on defense orders, when you

need steel you need it *quick*. And we have it—on hand in eight warehouses located in the big manufacturing centers where we can get it to you in a hurry. So whenever you need steel, steel products, copper or brass—call Scully. We've made the Scully name famous by serving all customers, large or small, with equal speed and courtesy.

Send for the Scully Stock List and Reference Book . . . it's free

SCULLY STEEL PRODUCTS COMPANY

Distributors of Steel, Steel Products, Copper and Brass

Warehouses at CHICAGO • NEWARK, N. J. • ST. LOUIS • BOSTON
ST. PAUL-MINNEAPOLIS • CLEVELAND • PITTSBURGH • BALTIMORE

UNITED STATES STEEL

Scully Service

The Mark of Service

ALLOYS
ANGLES, HOT ROLLED and COLD ROLLED
ARCHES (CORRUGATED)
BABBITT
BANDS and HOOPS
BARS, HOT ROLLED
ALLOYS (HR and CF)
COLD FINISHED
ELECTRIC HIGH CARBON STEEL
REINFORCING
BEAMS and C. & B. SECTIONS
BEEF RAIL
BOLTS, NUTS, WASHERS, ALL KINDS
BORING and TURNING BARS and GRINDERS
BRACES, BOILER
CHAIN, ALL KINDS
CHANNELS
CHISELS
CHUCKS, STAYBOLT
CLAMPS, BOILERMAKERS
CLIPS, PATTERSON
CLEANERS, FLUE
CONDUCTOR PIPE
COPPER and BRASS
COUPLINGS, HOSE
CRAYONS, SOAPSTONE
CUTTERS
DARDELET RIVET and MACHINE BOLTS
DRILL RODS
EAVE TROUGH and FITTINGS
EXPANDERS, FLUE
FERRULES, COPPER
FLANGES, BOILER and TANK
FLOOR PLATES
GALVANIZED SHEETS, BARS, BANDS
HANDLES, HAMMER
HEADS, TANK and FLANGE
HOISTS, HAND and POWER
IRON, STAYBOLT
LUGS, BOILER, TANK and SILO
MACHINERY, HAND and POWER
MANHEAD PLATES and FITTINGS
NAILS
PACKING
PAINT STICKS
PLATE STEEL, STANDARD QUALITIES
ABRASION RESISTING
COR-TEN and MAN-TEN
PLUGS, FLUE
RAILS and FITTINGS
REAMERS
SHAFTING
SHEETS
ABRASION RESISTING
ELECTRICAL
COR-TEN and MAN-TEN
HOT ROLLED and UNIFORM BLUE
WELLSVILLE POLISHED
COLD ROLLED
STAINLESS STEEL
GALVANIZED and GALVANNEALED
LONG TERNE
CORRUGATED
U-S-S COPPER STEEL
SPRING STEEL BARS and SHEETS
STAINLESS STEEL
STRIP STEEL, CR and HR
TES
TIRE, ROUND EDGE
TOOLS, HAND and POWER
for BOILER and IRON WORK
TROLLEYS
TUBES, BOILER
TURNBUCKLES
VALVES, BLOW-OFF
WELDING ROD and WELDERS
ZEES

The Mark of Quality





Again Develops A *NEW PERFECTION*

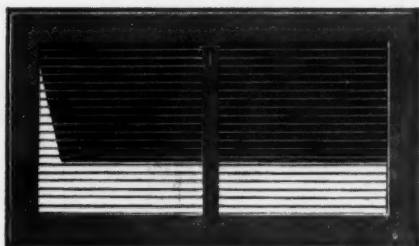
40 Series GRAVITY BASEBOARD REGISTER



A leak-proof register with detachable frame. Installs without changing original sizes, eliminates patching walls and redecorating. Has less resistance (for equal or greater capacity) than the usual baseboard gravity register. Flex-bars may be set with Setting Wrench.

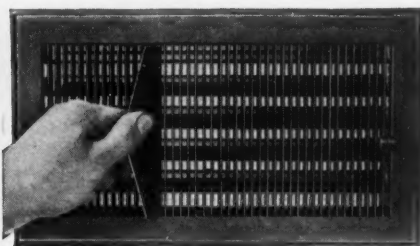
*NEW REDUCED COSTS of U. S. Air-Conditioning Registers
Places the Finest Directional Flow Lines Within Easy Reach*

THESE THREE POPULAR LINES WERE ORIGINATED AND
PERFECTED BY U. S. AIR-CONDITIONING REGISTER ENGINEERS



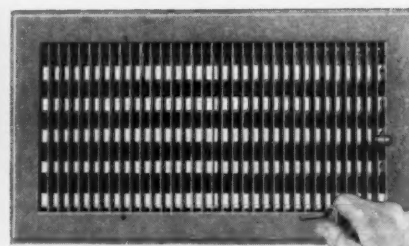
STYLE 153 Louver-Type

Style 153 Louver-Type Single-Valve, competitively priced yet good enough for the best class of installations.



STYLE 256 Flex-Bar Multiple-Valve

Style 256 Flex-Bar Multiple-Valve Line that does the job and "speaks" the truth.



STYLE 249 Adjustable-Bar

Style 249 Adjustable-Bar Multiple-Valve Line gives complete adjustability four ways.

REMEMBER *the Finest Floor Registers,
FACES and GRILLES are made in the Modern U. S. Factories
and distributed from our branches and by leading jobbers in all
sections of the nation. Be sure and write for latest revised list prices.*

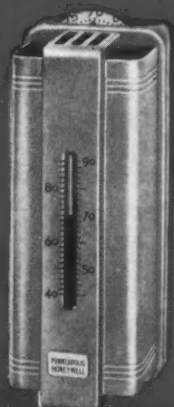


UNITED STATES REGISTER CO.

BATTLE CREEK, MICHIGAN

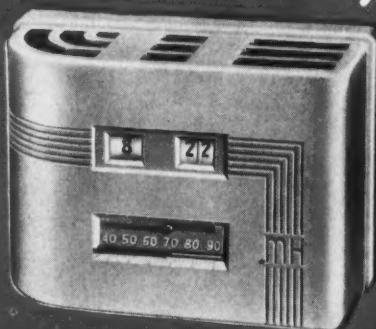
MINNEAPOLIS • KANSAS CITY • ALBANY • SAN FRANCISCO • NEW YORK, N. Y.

A COMPLETE LINE OF *Dependable* CONTROLS FOR EVERY PURPOSE



THE ACRATHERM

The finest plain pattern thermostat on the market. Heat acceleration enables it to actually sense temperature changes before they are noticeable. Extremely sensitive and accurate.



THE CHRONOTHERM

Incorporates all the advantages of the Acratherm but in addition automatically lowers temperature at night when heat is not needed and automatically restores it in the morning at the hours selected.



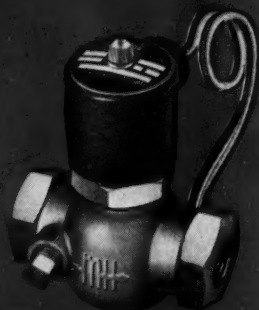
ELECTRIC JANITOR DAMPER MOTOR

Small, sturdy and efficient motor, designed for application on domestic damper control and zones control installations. Has two crank arms and built in switch for manual operation. Should power fail, a powerful spring drives motor arm to closed position.



METAPHRAM WARM AIR REGULATOR

Attached directly to the furnace and operates on cooling temperature changes. Draft and check dampers are operated to maintain a balance between cooling and return air temperatures thereby providing even temperature in the house.



GAS SOLENOID VALVE

Two wire type. Incorporates special shading coil and centering washer to ensure silent operation. Provision for manual opening or closing during power failure available. This feature allows only fully opened or fully closed position.



COMBINATION LIMIT CONTROL AND FAN SWITCH

Has convenient built in "manual-automatic" two position switch for manual operation of furnace blower. Increased electric ratings—1 h. p. at 115 volts A. C.; 1½ h. p. at 230 volts A. C. No need for separate starter for 1½ h. p. A. C. motors.



PROTECTORELAY

Power or flame failure causes these relays to re-cycle automatically, giving the burner one more chance to start. This saves many needless service calls throughout the year. Available for intermittent or constant ignition type of oil burners. The Safety Switch is fully compensated—extreme basement temperatures cannot disrupt its stable timing.



STOKERELAY

Combines relay and simple synchronous timing mechanism in a single compact unit. It maintains fire in a stoker fired furnace or boiler during mild weather when the thermostat does not call for heat often enough to keep fire alive. Timing easily adjusted to operate the stoker for one-half to one and one-half minutes every half hour or hour.

Dependable CONTROLS COST LESS THAN SERVICE

WHEN you use dependable Minneapolis-Honeywell Controls, you reduce control service calls to the absolute minimum, and free service calls can represent the difference between a profitable or an unprofitable sale.

The Minneapolis-Honeywell line is complete. It includes controls for every heating or air conditioning need, each specifically designed for its own particular function and so designed that the entire system is completely co-ordinated. One stock is adequate.

It's an established fact that when you standardize on Minneapolis-Honeywell you remove any possible objection to the controls in the sale of your automatic heating equipment. You also know you are giving your customers the best control equipment money can buy.

Minneapolis-Honeywell Regulator Co., 2726 4th Ave. S., Minneapolis, Minn. Canadian Plant: Toronto. European Plant: London. Company owned branches in 49 cities.

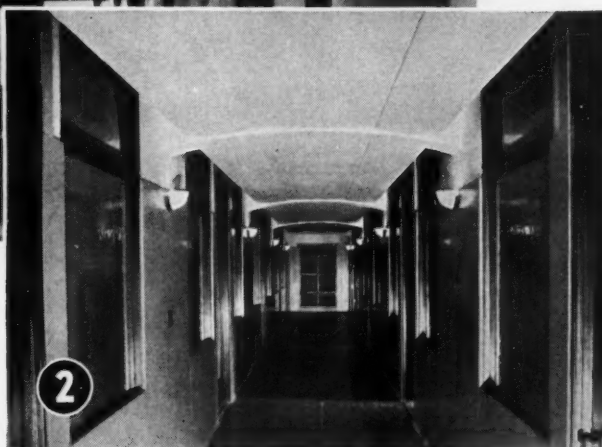
MINNEAPOLIS-HONEYWELL

CONTROL *Systems*

"WHERE are we going to put the ducts?"



- 1.** Air ducts in the Union Building, New Orleans, nest above false ceilings made of galvanized ARMCO PAINTGRIP sheets. Useless space became used space, and the contractor realized a good profit from the extra work.
- 2.** The ability of galvanized ARMCO PAINTGRIP sheets to take and hold paint resulted in a fine-looking job that pleased owner, engineer and architect.



• Finding space for new ductwork in an old building is no easy task. Yet the engineer and contractor who designed and installed an air conditioning system in the Union Building, New Orleans, discovered a way to save much expensive remodeling and provide a lot of extra sheet metal work in the bargain.

They found the space under the high corridor ceilings and put the big trunk ducts there. Then they concealed the ducts beneath false ceilings made of galvanized ARMCO PAINTGRIP sheets. By putting useless space to work, the costly job of tearing out floors and walls was eliminated. And by using galvanized ARMCO PAINTGRIP for the false ceilings, it was possible to paint

the job at once with every assurance the paint would beautify and protect the metal for a long time.

The architect and engineer were pleased with the way the work harmonized with interior design. And the owner was glad to get what he wanted for a lot less than he expected to pay.

Get your share of this money-making work in air conditioning. The nearby ARMCO Distributor will be glad to help. He has valuable literature that frequently can be used to turn up some desirable work. Call him or ask his salesman about it—or send your request to the following address. The American Rolling Mill Company, 621 Curtis Street, Middletown, Ohio.

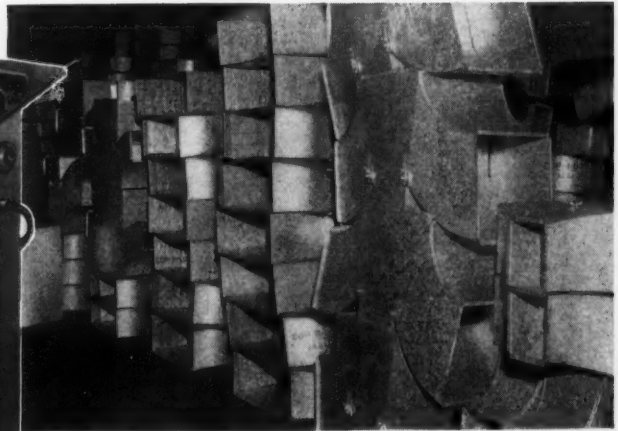
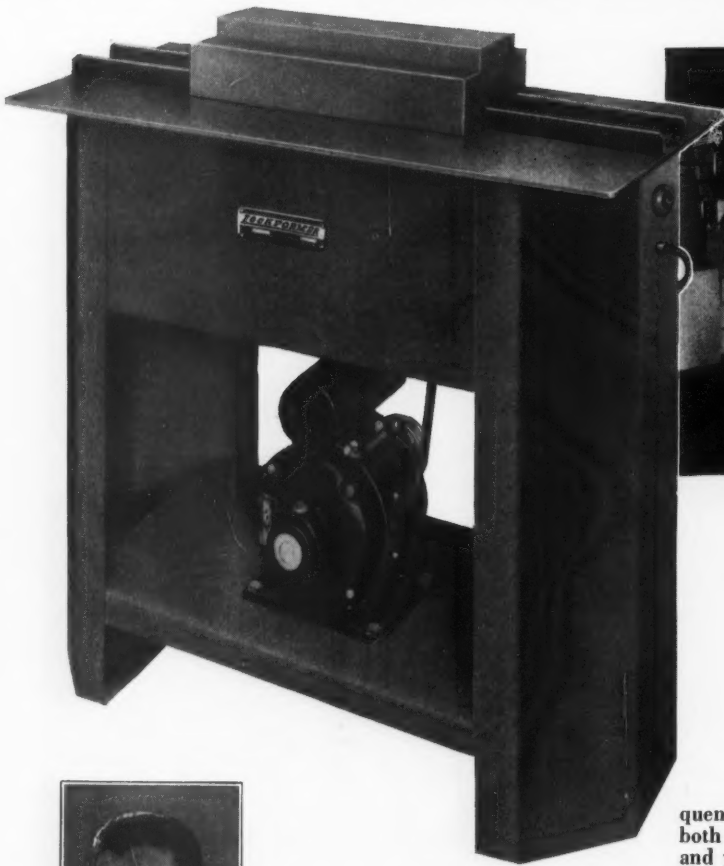
Galvanized



ARMCO PAINTGRIP SHEETS

LOCKFORMERS "DRAFTED"

TO SPEED NATIONAL DEFENSE PROJECTS!



Shown above are a group of Lockformer fabricated fittings for duct installation at Fort Sheridan and Rantoul, Illinois, Housing Projects—contracts being handled by the Airco Company, Chicago.



**"15 MAN SHOP
(Lockformer Equipped)
KEEPS OVER 60 MEN BUSY
IN THE FIELD"**

... writes Mr. E. J. Krestan, in charge of construction for the Airco Co. Mr. Krestan also tells us that: "... our Lockformer saves us at least 3c per pound in fabrication and speeds erection because of the perfect uniformity of its work. "In addition to these government jobs, we are working on other contracts totaling over 300,000 pounds so that our Lockformer 18 is pretty well tied up. In fact, about all we have used the 18 for on this government work is for one real 'quantity production' run of drive cleats. As a conse-

quence, we have used our little 24 almost exclusively—both for Pittsburghs as well as for right angle flanges—and you can quote me as saying that it's a real 'heavy duty' machine.

"Thanks to our Lockformer equipment, we're getting all our fabrication out on schedule. It has not been necessary to add to our shop space at all, and we have merely rented storage space to keep fittings such as shown in the enclosed picture until they can be transferred to the job. Our fifteen man shop keeps over sixty men busy in the field."

Mr. Krestan's letter is typical of dozens in our files. Day in and day out, Lockformers continue to set new records for efficiency, for speed, for worthwhile savings ... as more and more new users become acquainted, at first hand, with the remarkable reductions in fabrication costs the Lockformer offers. May we send you complete facts?

**ONE MAN AND A LOCKFORMER CAN MAKE MORE PITTSBURGH LOCKS THAN
SIXTEEN MEN WORKING AT EIGHT BRAKES**

THE LOCKFORMER CO.

4615 ARTHINGTON STREET, CHICAGO, ILLINOIS

"You're missing a good bet

**...if you're not selling
the whole works"**

TURN TO 



"That's what I did—turned to G-E. Today I sell the whole works. Air Conditioning—winter and summer—and Commercial Refrigeration. It's the best prescription I know for a healthy business. And when I say healthy, I mean *steady, profitable* sales. *Every* month in the year. Without any discouraging seasonal slumps.

THE G-E SEAL SELLS GOODS!

"You hear a lot about public acceptance for certain products. Well, nobody enjoys *more* of that than General Electric. G-E's unusually high quality and fine reputation *make* sales. They keep me and my customers *sold*. I know because it's G-E quality and reputation *I cash in on!*

G-E BACKS UP ITS DEALERS!

"Mighty important too for a really *profitable* business is all the *extra* help only a *big* company like G-E can give. Advertising and sales promotion. Direct mail and display. Technical and sales training. Financing, accounting, organizing. I cash in on these as part of the great G-E dealer set-up. *You can too.*"

J. N. Wilson — successful G-E Dealer — Owner of Wilson Electric Company, Bennettsville, S. C., knows what he's talking about. His books prove he's making money with the complete G-E lines. What he has to say may show you the way to bigger and better profits and a healthy year 'round business.

SEE OTHER SIDE . . . MAIL TODAY

**SEE THE
COMPLETE G-E LINE!**
ON THE OTHER SIDE

USE THIS HANDY POSTCARD 

NO POSTAGE REQUIRED

Postage
Will Be Paid
by
Addressee

No
Postage Stamp
Necessary
If Mailed in the
United States

BUSINESS REPLY CARD
First Class Permit No. 138, Sec. 510, P. L. & R.
Bloomfield, N. J.

GENERAL ELECTRIC CO.
5 LAWRENCE STREET
BLOOMFIELD, N. J.



"IT'S THE COMPLETE ... YEAR-'ROUND PROFIT LINE"

**FOR AMBITIOUS DEALERS
WHO WANT TO MAKE MONEY**

MAIL FREE POST CARD
(BELOW) FOR FULL DETAILS



OIL BURNERS

OIL BURNERS

An attachment type burner. Priced on the nose with competition. Many exclusive features—1 to 3 gal. per hr.—141,000 to 423,000 Btu per hr. For steam, vapor, hot water and warm air systems. Owners report up to 25% fuel savings.



ROOM COOLERS

ROOM COOLERS

Completely self contained, compact, quiet and economical in operation. New models with exclusive, saleable features—priced to meet competition. Floor models: $\frac{1}{2}$ and $\frac{3}{4}$ hp.—6,600 to 8,700 Btu per hr. Cools, circulates, ventilates, dehumidifies and cleans the air. Window sill model: $\frac{1}{2}$ hp.—5,400 Btu per hr.



WATER COOLERS

WATER COOLERS

17 different models—53 specific sales features. Sealed condensing units in office models to reduce service losses. G-E has contributed more outstanding features to water cooler design than any other manufacturer. A profitable year-'round market.

OIL FURNACES (BOILERS)

The one outstanding furnace on the market today. Owners report fuel savings of 25% to 50%. Domestic hot water coil optional. 7 sizes: 0.7 to 4.25 gal. per hr.—75,000 to 450,000 Btu per hr. For steam, vapor and hot water systems. Compact, easy to install. Competitively priced.



OIL FURNACES

GAS FURNACES (BOILERS)

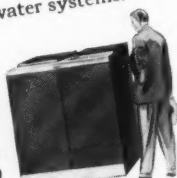
Fast steaming at low cost. Gas pressure regulator, high steam transfer, complete combustion—for greater economy. A. G. A. approved. 9 sizes: 1.1 to 10.3 boiler hp.—39,000 to 345,000 Btu per hr. For steam, vapor and hot water systems.



GAS FURNACES

WARM AIR FURNACES

Abundant heat (oil or gas fired) plus winter air conditioning—at no extra cost. Humidifies and filters, circulates heated air. OIL: 3 sizes, 0.95 to 1.90 gal. per hr.—100,000 to 200,000 Btu per hr. GAS: 14 sizes, 60,000 to 270,000 Btu per hr. Listed by Underwriters' Laboratory.



WARM AIR FURNACES

AIR CIRCULATORS

Complete, new and different line for 1941. 5 models: 20" to 48" fans, window and attic mounting—3500 to 16,000 cfm. All low cost, volume sales makers!



AIR CIRCULATORS

STORE COOLERS

Famous G-E "Packaged Weather." A wide market among homes, restaurants, stores, shops, hotels and hospitals. 6 sizes: $1\frac{1}{2}$ to 10 hp.—19,740 to 113,400 Btu per hr. net cooling capacity. Available on small down payment with skip-payment plan.



STORE COOLERS



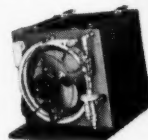
CONDENSERS

CONDENSING UNITS

The famous G-E Scotch Giant Condensing Units are the "heart" of efficient cooling. 15 types—air cooled $\frac{1}{4}$ to 3 hp. 8 types—water cooled— $\frac{1}{3}$ to 3 hp. (There's a steady replacement market alone in these units.)

CONDITIONED AIR COOLING UNITS

Only G-E has Conditioned Air Cooling Units. 8 types—wall and ceiling mounted—delivery capacities 1,400 to 12,000 Btu per hr. A big market in every business requiring food storage, reducing or eliminating food odor transfer and food shrinkage, correcting humidity.



CONDITIONED AIR COOLERS



STORAGE CABINETS

STORAGE CABINETS

Self contained ready to plug-in and remote units—reach-in and walk-in G-E Commercial Storage Cabinets and G-E Dairy Merchandisers. Also—the G-E Ice Cube Maker— $\frac{1}{2}$ hp., 5 cu. ft. Here is another market that pays year 'round dividends.

BEVERAGE COOLERS

A popular line of wet storage beverage coolers with strong sales features. Three models— $\frac{1}{3}$ to $\frac{1}{2}$ hp. Cooling capacity, 56 to 185—6 oz. bottles. Wherever bottled beverages are sold—a profitable market.



BEVERAGE COOLERS

FOR YEAR 'ROUND PROFITS—MAIL TODAY

GENERAL ELECTRIC CO.
Div. 153, Bloomfield, N. J.

I want all details on the G-E Dealership
for my territory ☐ particularly on the items checked.

- | | | | |
|---------------------------------------|--|---|--|
| <input type="checkbox"/> OIL BURNERS | <input type="checkbox"/> WARM AIR FURNACES | <input type="checkbox"/> ROOM COOLERS | <input type="checkbox"/> CONDITIONED AIR COOLING UNITS |
| <input type="checkbox"/> OIL FURNACES | <input type="checkbox"/> AIR CIRCULATORS | <input type="checkbox"/> WATER COOLERS | <input type="checkbox"/> STORAGE CABINETS |
| <input type="checkbox"/> GAS FURNACES | <input type="checkbox"/> STORE COOLERS | <input type="checkbox"/> CONDENSING UNITS | <input type="checkbox"/> BEVERAGE COOLERS |

NAME _____

STREET _____

CITY _____

STATE _____

NO POSTAGE REQUIRED

ORGANIZING • TRAINING • ADVERTISING • PROMOTION

If it helps you make sales—G-E's got it for you! National magazine, trade and specialty, cooperative local newspaper advertising—direct mail—literature—display—billboards—publicity—dealer and customer publications—stationery—business organization and assistance—sales manuals—application engineering, service and installation assistance.

FILL IN CARD—MAIL IN TODAY!

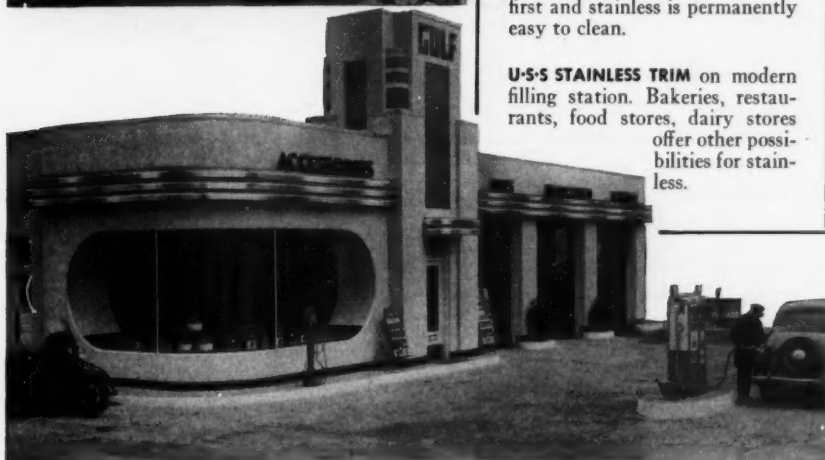
THE POST OFFICE WILL ACCEPT THIS CARD—NO POSTAGE NEEDED

GENERAL  ELECTRIC

How *Stainless Specialties* become Big Business for sheet metal workers



STAINLESS SERVING TABLE, cupboards and water cooler in a modern hospital. Cleanliness ranks first and stainless is permanently easy to clean.



U-S-S STAINLESS TRIM on modern filling station. Bakeries, restaurants, food stores, dairy stores offer other possibilities for stainless.

U-S-S STAINLESS STEEL is proving a metal of endless possibilities for sheet metal workers. We have dozens of cases on file where shops have started out making a stainless specialty such as kitchen sinks. Customers are delighted with this sparkling, easy to clean metal. One job brings in two or three more . . . and soon the "specialty" turns into the most profitable part of the business.

In three years' time a shop on the west coast grew so fast that now most of their business is in U-S-S Stainless. Our stainless steel specialists helped them get started, showed them how easy it was to fabricate stainless, gave them instructions on what tools were necessary, where to look for business and how to go about getting it.

A man in New York made a specialty of restaurant sinks and food handling equipment. He was soon getting installations in hospitals, schools and industrial cafeterias. Then he branched out to making dairy equipment of U-S-S Stainless.

The opportunities are endless for this bright, popular metal. Most jobs are built to suit local conditions. That's why the man right in the community has the edge on anybody else. Make up your mind now to get into this flourishing business. Send the attached coupon.

*How to become a
Stainless Steel Specialist*

U-S-S STAINLESS STEEL

AMERICAN STEEL & WIRE COMPANY, Cleveland, Chicago and New York

CARNEGIE-ILLINOIS STEEL CORPORATION, Pittsburgh and Chicago

COLUMBIA STEEL COMPANY, San Francisco

NATIONAL TUBE COMPANY, Pittsburgh

Scully Steel Products Co., Chicago, Warehouse Distributors • United States Steel Export Co., New York



United States Steel Corp. Subsidiaries
Room 623, Carnegie Bldg.
Pittsburgh, Pa.

Gentlemen: Please send me the details on becoming a specialist in stainless steel.

Name.....

Address.....

City..... State.....

UNITED STATES STEEL



He's made a *Great Discovery*



The man who installs automatic controls or who takes care of customer service, quickly discovers why Perfex Twin Contact Controls have so rapidly come to leadership in the field. The thousands of service men who have had actual experience with them are practically unanimous in their verdict: Twin Contact Controls demand less service attention than any comparable equipment.

Even those service men who have not yet had the opportunity to work with Twin Contacts can — and do — appreciate the engineering which has gone into them. Ease of installation is obvious when you see how they are designed and built. Covers, mountings, terminal screws, have been planned to help the man on the job. The same thoughtful and experienced engineering is equally evident when you examine the operating and adjusting mechanisms.

Twin Contact Controls, made by Perfex, are sold by and under the names of the manufacturers of the heating equipment with which they operate — and for which, in each case, they are specially built and adjusted.

PERFEX CORPORATION

500 West Oklahoma Avenue, Milwaukee, Wisconsin

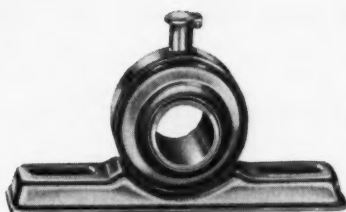


Twin Contact Controls

Oil taken from typical bearing, BRAND "A" measures 165 minims (Standard drops.)

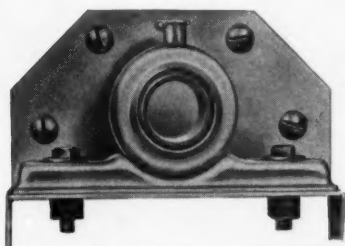
Oil from Lau Pillow Block same size as BRAND "A" bearing. Measures 304 minims (Standard drops.)

OVERSIZE OIL RESERVOIR BUILT INTO EVERY LAU PILLOW BLOCK



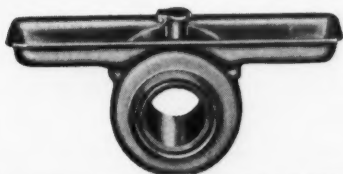
STANDARD LAU PILLOW BLOCK FEATURES

Positive self aligning at all times. Oil tight steel housing. Self lubricating bearing seat for collar. Felt wicking all around bearing assures constant lubrication; prevents oil from spilling in shipment. Metallic ground strip for static elimination. Long bolt slots for each installation.



FLANGE TYPE PILLOW BLOCK

Has side flange for fastening bearing to vertical surfaces.



INVERTED TYPE BEARING

For fastening bearing to underside of surface. Oil cup on top for easy access prevents spilling oil.



PATENTED CONSTRUCTION ASSURES CONTROLLED OIL FLOW..NO OIL LOSS.. LONGER SERVICE - FREE BEARING LIFE

The Lau Pillow Block's oversize oil reservoir means far longer service-free operation than is generally possible with bearings which imitate the Lau construction. The Lau Pillow Block uses the interfacial tension forces of Liquid-solid surfaces to squeeze the oil through minute pores of metal and to literally float the shaft and its load away from all metallic contact both when the bearing is idle and when it is running.

The bearing walls of Lau Pillow Blocks are of sufficient thickness and have extremely fine pores to evenly distribute the oil. Such "controlled oil flow" uses only as much oil as is needed to float the shaft away from all metal contact, without permitting the shaft's rotation to suck the oil from the bearing down the shaft and thereby waste it.

4½ years constant operation without oiling

In the Lau laboratory, a Lau Pillow Block has been operating continuously for over 4½ years without addition of any oil. This is estimated as equivalent to over 10 years of actual field operation. While we do not recommend the operation of these bearings over such great periods without attention, they are particularly adaptable and popular on all remote and inaccessible installations where neglect is probable. Write for illustrated bulletin, without obligation.

Write

THE LAU BLOWER CO.
2005 HOME AVE. DAYTON, OHIO





● You can't sell yesterday's stoker at yesterday's prices and stay in the stoker business. Give your customers highest quality at lower prices — Sell STOKERATOR.



STOKERATOR

Enables you to meet any competition—
QUALITY — PRICE — PERFORMANCE

No longer must you spend time and energy to sell the idea of stoker firing and then see your prospect buy a competitive stoker because of price. Now you can clinch those sales! STOKERATOR combines highest quality with unbeatable performance and unbelievably low price!

What more do you need to be the "tough competition" in your home market?

There's a complete line — a STOKERATOR for every job, domestic or industrial. Send for literature and prices NOW. Make more sales — more money with STOKERATOR!

PRICED TO RETAIL AS LOW AS
\$129.50
 WITH MH CONTROLS
 PLUS INSTALLATION

PROOF OF HIGH QUALITY

- ★ STOKERATOR uses the world's finest controls to guarantee full, superb performance.
- ★ Exclusive Air Muffler with automatic damper control eliminates 90% of noise. Increases efficiency.
- ★ Improved Zephyr type fan is quiet and maintains the desired air pressure automatically.
- ★ Dependable, heavy duty General Electric motor. Totally enclosed. Has automatic overload cut-out.
- ★ Lifetime Vanadium steel screws are heat-treated to resist wear. Deliver coal with less power.
- ★ Constant speed STOKERATOR lifetime transmission has remarkably high mechanical efficiency.
- ★ Beautiful, smooth finish hopper of sturdy automobile steel is low — easy to fill.
- ★ Perfected retort with sectional type tuyeres of highest heat resisting alloys.

Thousands of satisfied owners testify to STOKERATOR dependability.



NORTHERN STEEL AND STOKER CORP.
 PEORIA, ILLINOIS

Your Production Needs

are MET with

WEIRTON

Galvanized Sheets

There is a type of Weirton Galvanized Sheet to satisfy your exacting needs, whether it is *finish*, to accentuate the appearance of your products, or *adherence of coating*, to withstand your forming and drawing operations.

The same full measure of care and supervision is exercised in the manufacture of Weirton Galvanized Sheets as that which marks the production of WEIRTON Tin Plate—WEIRITE.

Get the maximum in quality and service for your production line—get galvanized sheets that meet your exacting production needs—make your next order Weirton Galvanized Sheets.



WEIRTON STEEL COMPANY

WEIRTON, W. VA.

Boston, 916 Statler Office Building; Chattanooga, Hamilton Bank Building; Chicago, 2128 Builders Building; Cincinnati, 2606-7 Carew Tower; Cleveland, 1217 Leader Building; Detroit, General Motors Building; Houston, 1901 Franklin Avenue; Indianapolis, Chamber of Commerce Building; Kansas City, Missouri, 231 West Forty-Seventh Street; New York, 405 Lexington Avenue; Philadelphia, Broad Street Station Building; Rochester, Genesee Valley Trust Building; San Francisco, 824 Sharon Building; St. Louis, E. R. Hensel Company, Cotton Belt Building; Montreal, Quebec, A. C. Leslie & Co., Ltd., P. O. Box 1420; Toronto, Ontario, A. MacNish, 357 Bay Street.

division of



NATIONAL STEEL CORPORATION

Executive Offices, Pittsburgh, Pa.

"The Proof of the Pudding"

is in
the Tasting
Thereof

● Sure there's money in the field of residential winter air conditioning—as many a successful dealer will testify—and there's money to be lost—as other sorrowing dealers can prove.

But if you are going to make money—you *must sell good equipment*—equipment that delivers results economically—that stands up in service without breakdowns—that doesn't rob you of your profits—and more—in service call costs.

Peerless Blowers—belt and direct drive—are standard equipment with many leading furnace manufacturers who can't take chances with performance. You can enjoy these same advantages in Peerless Blowers and Blower Units:

- 1 Remarkably satisfactory performance demonstrated by thousands of installations over many years.
- 2 Complete package units that are attractive in color, line and modern style to harmonize with any furnace installation.
- 3 Selection of belt drive or direct drive with automatic control to meet the demands of any residential heating situation.
- 4 Can be installed in any style of furnace—oil, gas or coal.

Mail the coupon for detailed information or ask your nearest jobber. Put the Peerless line to a test in *your business*, and you'll learn why Peerless is a leader with so many dealers.

THE PEERLESS ELECTRIC CO. • Warren, Ohio

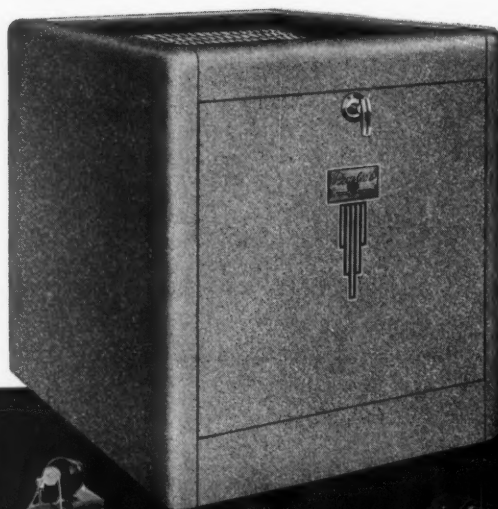
THE PEERLESS ELECTRIC CO., WARREN, OHIO
Tell us more about your belt
drive and direct drive blowers.

Name _____

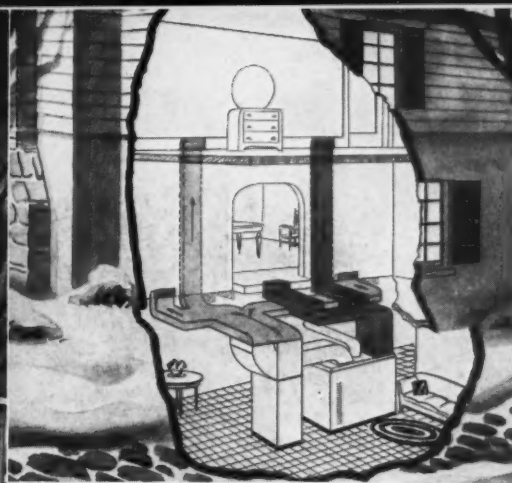
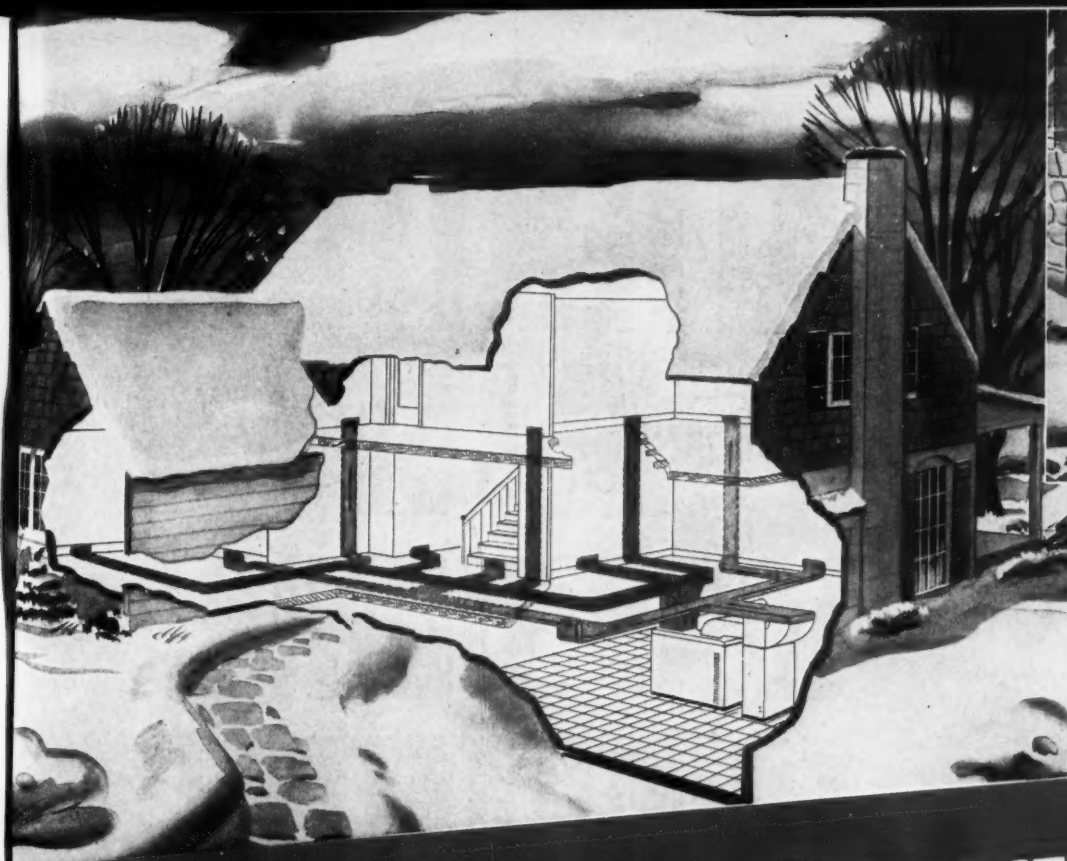
Address _____

State _____

City _____



Peerless blowers are made in both direct drive and belt drive. On the belt drive, blower motor can be used either in rear or on top of unit.



Note how simple it is to install Airtemp combination winter and summer air conditioning. Duct work is unchanged. The cooling unit is only 32"x20" on the floor. Here is a new, effective, low-cost sales clincher for home builders!

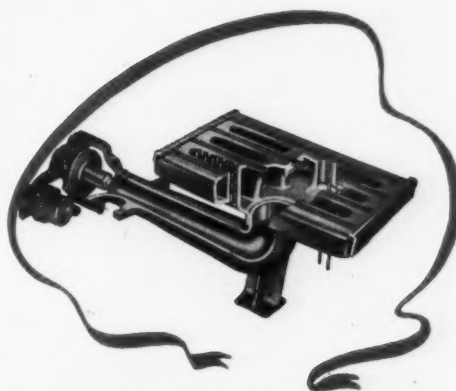
NOW EVEN MEDIUM-PRICED HOMES can have both heating and cooling

EXTRA COST OF COOLING AS LITTLE AS \$2.69 A MONTH .

A Big Market—Once a luxury, year-round air conditioning is now well within the budget for even medium-priced homes. The Airtemp air-conditioning furnace and ducts represent nearly two-thirds of a year-round air conditioning system. The addition of the cooling unit adds as little as \$2.69 a month to payments on a 20-year F. H. A. contract! The same blower, filters and ducts are used winter and summer.

A Low-Cost, Tested Unit—The Airtemp heating and cooling unit combines an air-conditioning furnace long in use in thousands of homes, with a packaged cooling unit now in use in thousands of shops, offices and restaurants. Mass production of both has lowered costs.

A Sales Leader—And here's a great selling point for Airtemp dealers—the furnace alone can be installed and the cooling unit added later! This economical, year-round air conditioning unit is a real *sales leader—without competition* at its price! Send for complete details.



AIRTEMP "SILENT FLAME" GAS BURNER

Features: no pop in starting or stopping
—no sound while burning—no flash backs.
Burns natural, mixed or manufactured gas.
Rustless, chrome-steel grids—cannot clog.

Oil, Gas and Coal Furnaces • Hot Air, Hot Water and Steam Systems • Oil Burners • Room Coolers • Packaged Air Conditioning Units • Complete Central Cooling Systems

CHRYSLER  **AIRTEMP**
AIRTEMP DIVISION OF CHRYSLER CORPORATION, DAYTON, OHIO

AIRTEMP DIVISION, CHRYSLER CORPORATION,
DAYTON, OHIO.

Send me complete information on the Chrysler
Airtemp combination heating and cooling unit.

Name _____

Address _____

ATTENTION AIR CONDITIONING CONTRACTORS

"Commercial" Offers You THIS NEW Venturi Type FAN HOUSING



● For the first time in the air conditioning field, a Presteel Fan Housing with the Venturi Section drawn down in one operation is available to you as a standard item.

Designed for exhaust and ventilating fans and unit heaters—furnished in a popular range of sizes and gauges—and offering features that decrease cost and increase fan efficiency.

In your 1941 air conditioning installations use Commercial Venturi Type Fan Housings.

Send today for the folder which contains the full story—and lists the sizes, gauges and features we offer you.

**The COMMERCIAL
SHEARING & STAMPING COMPANY**

1775 LOGAN ST.

● YOUNGSTOWN, OHIO

THE FIRM THAT IS FAMOUS FOR TANK HEADS, CIRCULAR SHAPES AND PRESSED STEEL PRODUCTS

redesigned

RESTYLED TO GO PLACES IN 1941



Moncrief Gas-Fired
Winter Air Conditioner



Moncrief Special
Oil-Fired
Winter Air Conditioner



Aristocrat Steel
Coal-Fired
Winter Air Conditioner

MONCRIEF

WINTER AIR CONDITIONERS

● You can go places, too, in 1941. Moncrief units brought right up to the minute in engineering design and construction give you everything you need to satisfy the most critical buyer from the standpoints of comfort, economy, efficiency and value.

The three units here illustrated are newly designed, reflecting the latest improvements and expressing the finest in style and finish.

When you represent the Moncrief line, you can always be sure that you can offer your trade all that is latest in winter air conditioning and warm air heating.

Moncrief also provides a full line of modern furnaces . . . Cast or steel with round and square casings . . . All types and sizes popularly priced.

Send for descriptive literature and prices

THE HENRY FURNACE & FOUNDRY CO.
3473 EAST 49th STREET CLEVELAND, OHIO

Only NU-WAY

OFFERS THIS OUTSTANDING

SHIELDED NOZZLE

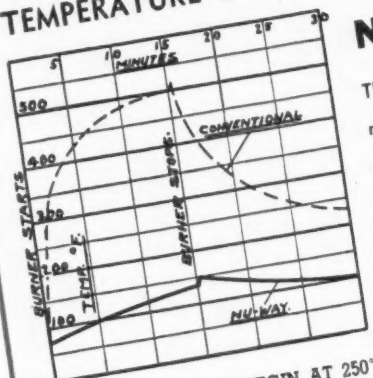
PATENT APPLIED FOR

Approved

BY UNDERWRITERS' LABORATORIES
SUCCESSFULLY BURNS $\frac{3}{4}$ GALLON
OF NO. 3 FUEL OIL PER HOUR



TEMPERATURE CHART



NOTICE

This chart represents nozzle temperatures and shows how the NU-WAY Nozzle Shield keeps temperature below carbonizing point.

CARBON DEPOSITS BEGIN AT 250°

What

THIS MEANS TO EVERY OIL BURNER DEALER

As an oil burner dealer more and more you are being confronted with the problem of installing oil burners in small, highly efficient heating units. The modern small furnace is provided with baffle plates and long fire travel—to increase its efficiency. It requires the burning of smaller quantities of fuel oil which reduces the high stack temperatures.

The NU-WAY SHIELDED NOZZLE (Listed by the Underwriters to Burn $\frac{3}{4}$ Gallon No. 3 Oil per hour) protects the oil burner nozzle from the intense heat radiated from the flame. It is this high heat temperature that causes carbon and nozzle clogging—and makes oil burners unable to use small nozzles.

For greater efficiency and successful operation, it will pay you to install NU-WAY burners with these outstanding features — The NU-WAY shielded nozzle (Pat. applied for); the NU-WAY Controlled Air-Control (Pat. applied for); and many other outstanding features.

NU-WAY MODEL XL



With the
Shielded
Nozzle

WHAT THIS MEANS TO FURNACE MANUFACTURERS

This outstanding NU-WAY Model XL Pressure Type Oil Burner, with the Shielded Nozzle has been and is being developed to meet exacting requirements for small warm air conditioners and small boiler units. We invite your interest.

WRITE TODAY

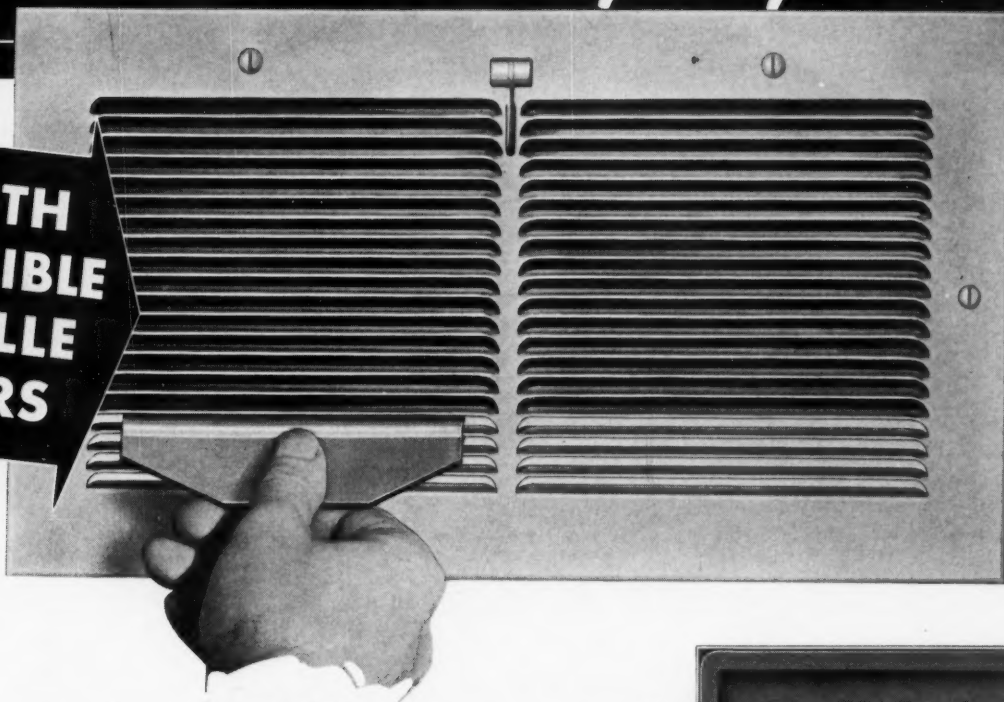
AND LET US TELL YOU MORE ABOUT THIS NEW ADVANCED METHOD exclusively developed by NU-WAY engineers to help you sell small successful automatic heat units.

THE NU-WAY CORPORATION

ROCK ISLAND, ILLINOIS

INDEPENDENT WROUGHT STEEL *Air Conditioning Registers*

**WITH
FLEXIBLE
GRILLE
BARS**

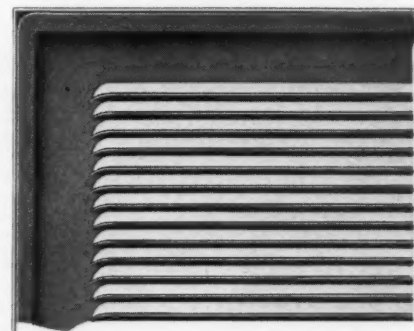


*Attractive, Efficient, and
Low in Cost*

*Always Leading...
Always Progressing*



● Fine appearance, economy and high efficiency are combined in this Independent Register. The grille bars are formed from sheet metal and come regularly adjusted to direct air flow slightly downward. Being flexible, they can be bent to direct air flow to any other desired angle, upward, downward or straight outward. Materials and workmanship are of first quality. Valve is positive, free working, and stays firmly in position. Write for catalog of this and other types of air conditioning and gravity grilles, registers and cold air faces.



Rear view of face

Easy to Adjust

With each shipment of flexible grille bar registers is included a tool for adjusting the bars to any required angle.

THE INDEPENDENT REGISTER CO.

3747 EAST 93RD STREET, CLEVELAND, OHIO

THERE IS NO SUBSTITUTE FOR

Experience.



Youth has its place, no doubt about it. But, it was a wise man who said, "Experience is the best teacher."

Here at OSBORN, we value the asset of being one of the oldest sheet metal distributing houses in America. That is only natural. But, we are even more proud of the way we work together happily year after year to do a real job in serving the great industry of which you and we are a part.

Yes, a number of OSBORN men have had twenty-five, thirty and even forty years

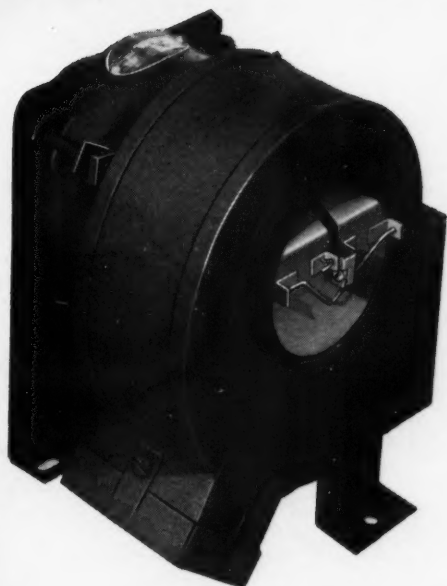
experience. In fact, our men at Cleveland average 14 years of service with the company. Yet, after 82 years, OSBORN is spry as a 2-year old and only recently built new general offices at Cleveland, doubled the size of its Cincinnati warehouse and added 8,000 square feet of space at its Buffalo division. These improvements were made for just one purpose—to continue, even in trying times, to give our trade the ever dependable service which we like to have them expect from us.

THE J. M. & L. A.
OSBORN Co
CLEVELAND, OHIO
BUFFALO • CINCINNATI • DETROIT
Manufacturers—Distributors of Metals and Metal Products

A DEPENDABLE SOURCE OF SUPPLY FOR 82 YEARS

FURNACE VAPORIZING BURNERS

give new possibilities

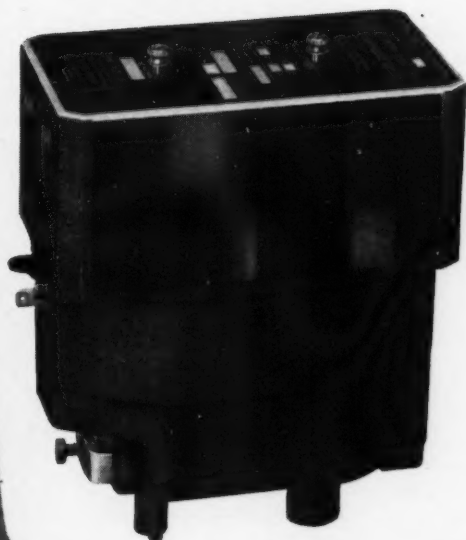


Furnace vaporizing burner units are gaining in popularity because they combine low initial cost and economical operation with satisfactory performance—a result that can now be expected when "Genuine Detroit" oil burner controls are used.

No longer is it necessary to depend on the chimney to produce a draft sufficient for proper combustion. This essential but uncertain factor need cause no concern on jobs that are equipped with "Genuine Detroit" combination air and fuel delivery control units.

It is important information for the dealer to know that the control of air and oil delivery are factory set, the complete unit ready for installation and operation when received from the manufacturer.

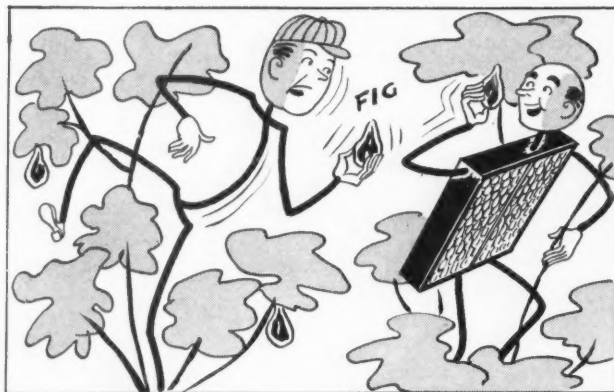
Made to meet the control requirements of vaporizing burners, "Genuine Detroit" furnace controls are available in the various types and combinations demanded by the industry.



DETROIT LUBRICATOR COMPANY
General Offices: DETROIT, MICHIGAN

Canadian Representatives — RAILWAY AND ENGINEERING SPECIALTIES LIMITED, Montreal, Toronto, Winnipeg





Heating Contractor: So what? You say Fiberglas* Dust-Stop* Air Filters are standard equipment on 85% of all forced warm air heating and air-conditioning equipment. I don't care a fig!

Dust-Stop Man: But you can make money pushing 'em!



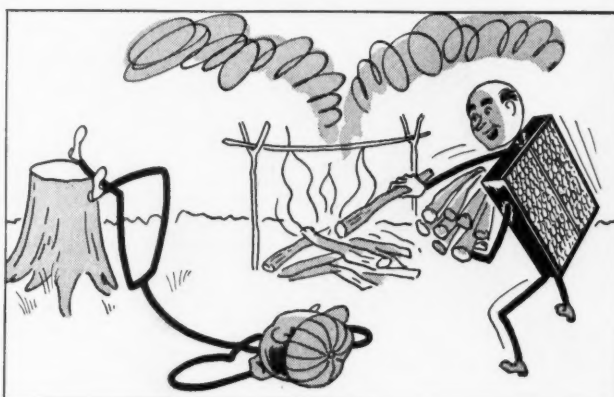
H. C.: Me sell a little item like Dust-Stops?

D. S.: They may be little, but they're long on profit, and *easy* to sell! Dust-Stops not only give you a nice annual income from every one of your forced-air furnace customers . . . but *also* give you a chance to sell your other services and materials!



H. C.: Have they any sales helps with punch?

D. S.: Sure! Dust-Stops have the biggest and best set of free dealer helps in the filter industry! They even provide a Classified Where-To-Buy-It heading to list your name under!



H. C.: Anything else hot?

D. S.: Yes! Dust-Stops are guaranteed by the makers of Fiberglas. And you don't have to keep a big stock on hand. You get *fast delivery all* the time!



H. C.: Now you're talking!

D. S.: You bet! And here's a little sales-tickler for your customers: Dust-Stops are firesafe! Their glass fibers *won't* support combustion! Neither will the adhesive!



D. S.: . . . And Dust-Stops have a price and discount policy that's tops! Everybody profits!

H. C.: Why didn't somebody tell me about this before? Even a blind man can see that *no other filter* has all the advantages of Dust-Stops!

FIBERGLAS* DUSTOP* AIR FILTERS

* T. M. Reg. U. S. Pat. Off.

Made by Owens Corning Fiberglas Corporation, Toledo, Ohio

DIRECT CANADIAN INQUIRIES TO FIBERGLAS CANADA, LIMITED, OSHAWA, ONTARIO

WATER, WATER EVERYWHERE
(AND THE DUCTS WILL HAVE TO TAKE IT)

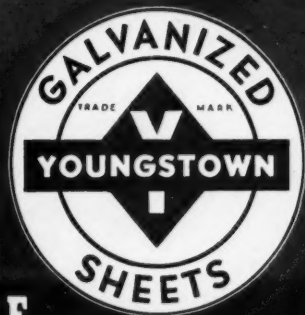
★Fine as modern air conditioning is agreed to be, its corrosive moisture content is a definite challenge to sheet metal and to you, the sheet metal contractor.

Knowing this, Youngstown has taken special care to see that Youngstown Galvanized Sheets will give you the service that is essential in modern duct work. Making a galvanized sheet is possibly the most personalized job in a steel mill, and Youngstown is particularly proud of its galvanizing department. Men who have given an intense study in their jobs -- men who know by long experience just how much heat and immersion are necessary for perfect zinc covering with full ductility of the sheet -- those are the men who do the galvanizing you buy from Youngstown. Because of them your jobs, when made with Youngstown Galvanized Sheets, will go in on schedule and stay put.

★

Sheets - Plates - Pipe and Tubular Products - Conduit - Tin Plate - Bars - Rods - Wire - Nails - Tie Plates and Spikes

10-14C



THE
YOUNGSTOWN
SHEET AND TUBE COMPANY

Manufacturers of Carbon, Alloy and Yaloy Steels
General Offices - YOUNGSTOWN, OHIO



AIR CONTROL presents a new line of grid-type Floor Registers and Return Air Faces with a new **medium mesh** at no extra cost! This grid spacing (9/16" between frets) is an ideal mesh for it is "heelproof" yet has ample free area—it also gives added strength and improves the concealment of the duct.

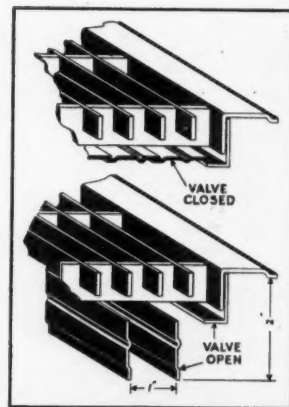
These Registers and Faces are of interlocking grid construction—built of heavy 14 gauge steel that assures ample strength and durability. All popular finishes are baked with the new Infra-Red Process—producing the finest painted finishes procurable—your assurance of long life and durability. All of these extra features cost no more—it pays to standardize on AIR CONTROL!

WRITE TODAY FOR THE LATEST AIR CONTROL CATALOGS—showing the complete AIR CONTROL Line—Dual Control Air Conditioning Registers and Grilles, Popular Priced Directional Flow Registers, Modern Flexible Fin Gravity Registers, Attic-Louvers and Damper Control Sets.

Air Control Distributors carry complete stocks in principal cities.

New SHALLOW VALVE

—on all Floor Registers, is only 2" deep when open
—an ideal condition for sidewall installations. When closed the valve is close to the face—making it easy to clean without removing from the floor.

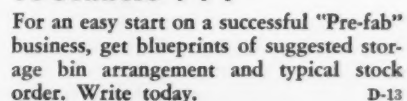


AIR CONTROL PRODUCTS, INC.
MUSKEGON MICHIGAN

[illegible]

Save money with a lower installed cost . . . made possible by the use of

Get yourself a reputation as an "expert" on forced air work. Use Mueller "Pre-fab" on your next job. For details ask your jobber, or write **L. J. Mueller Furnace Co., 2010 W. Oklahoma Avenue, Milwaukee, Wis.**



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37

AEROFIN

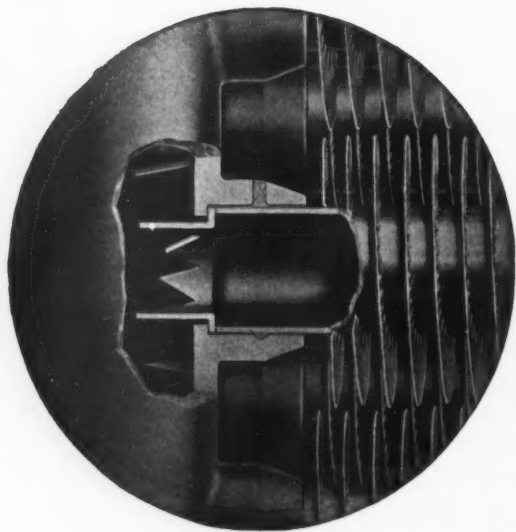


Wild Horses

CAN'T PULL 'EM APART

• Yes, so strongly are the Aerofin tubing and headers bonded that even a team of wild horses couldn't pull them apart. A special high-temperature brazing method in which the tube is inserted in the header nipple provides a joint that is actually *stronger* than the tube itself. One-piece bronze castings, accurately machined, and copper tubing built to rigid specifications form a header joint that is sure to last.

• When your heating specifications call for coils that will stand up under all conditions — call for AEROFIN.



AEROFIN CORPORATION

410 S. GEDDES ST., SYRACUSE, N. Y.

CHICAGO • DETROIT • NEW YORK • PHILADELPHIA
DALLAS • CLEVELAND • TORONTO

THE LETTER you should read...and remember
to reap more profits this year!

S. S. SMITH

SHEET METAL CONTRACTOR • 25 REGENT STREET • ASHVILLE

February 1941

TO MY CUSTOMERS:

I am proud to announce the best news in the history of my business! This year I am selling the famous line of **SUNBEAM** Warm-Air Furnaces and Winter Air Conditioners - advertised in national magazines and newspapers from coast to coast.

In this complete line there's a Unit to fit your needs - designed to bring you real comfort and fuel-savings over the years. And there are special Units for all fuels - Coal - stoker or hand-fired - Oil or Gas - all scientifically engineered, highly efficient and beautifully styled.

In addition, if you are modernizing you can use my Easy Payment Plan: No down payment, no payments for 2 months, up to 3 full years to pay on low monthly terms!

So why not let me show you the complete **SUNBEAM** line today? As an old-timer in this business I think it has everything you'll want - and I believe you'll agree with me!

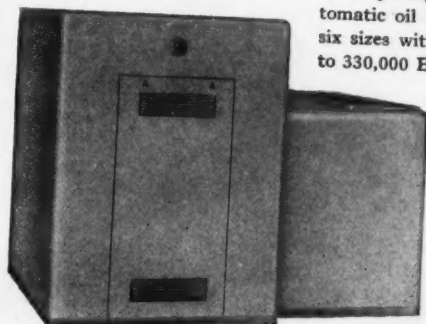
Cordially yours,

these are just a few of the reasons why more

SUNBEAM

WINTER AIR CONDITIONERS

have been installed than any other make



Sunbeam Series No. 1100 Winter Air Conditioner.
A completely coordinated unit for automatic oil fired air conditioning. In six sizes with capacities from 95,000 to 330,000 BTU per hour at register.



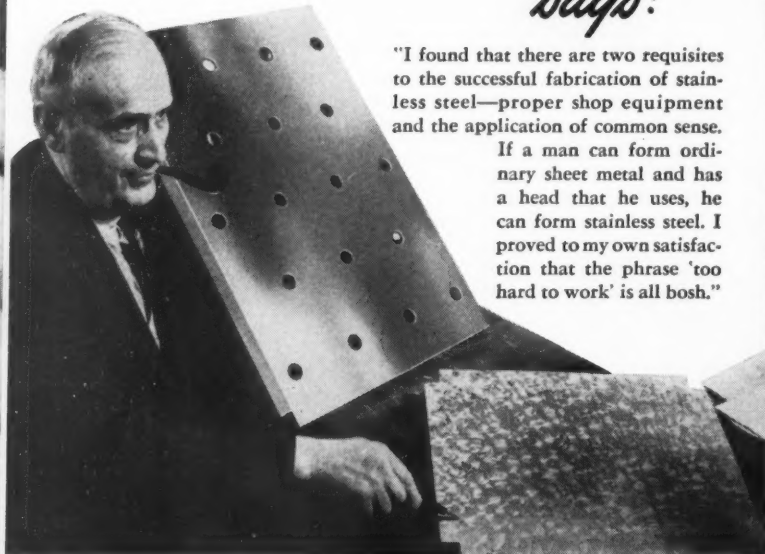
WRITE today for full information on the complete and fast-selling **SUNBEAM** line, and for the name of the **SUNBEAM** Jobber nearest you. And remember, when you sell **SUNBEAM** Units on our Easy Payment Plan you get full cash on installation!

AMERICAN & **Standard**
RADIATOR & **Sanitary**

New York CORPORATION Pittsburgh

Copyright 1941, American Radiator & Standard Sanitary Corporation

MR. M. J. (Mike) CUTTER,
Cutter Sheet Metal Manufacturing Company,
says:



"I found that there are two requisites to the successful fabrication of stainless steel—proper shop equipment and the application of common sense.

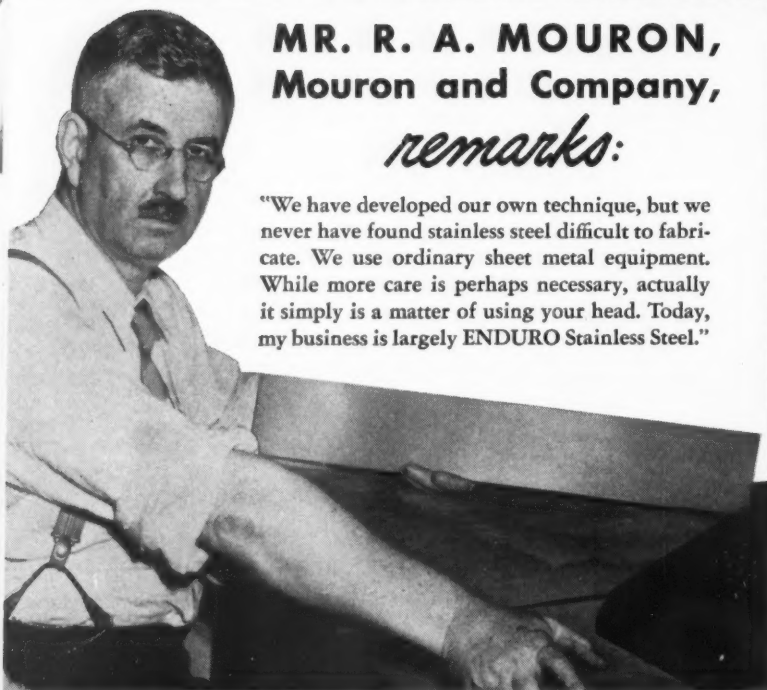
If a man can form ordinary sheet metal and has a head that he uses, he can form stainless steel. I proved to my own satisfaction that the phrase 'too hard to work' is all bosh."

MR. LEON STUDER,
Sheet Metal Contractor,
states:



"We form all of our stainless steel by hand. The only piece of sizeable equipment is an eight-foot hand brake. I prefer ENDURO* from every standpoint, but it has two qualities especially that help my profits. Its ease of fabrication keeps my cost down and its attractive appearance keeps customers happy."

MR. R. A. MOURON,
Mouron and Company,
remarks:



"We have developed our own technique, but we never have found stainless steel difficult to fabricate. We use ordinary sheet metal equipment. While more care is perhaps necessary, actually it simply is a matter of using your head. Today, my business is largely ENDURO Stainless Steel."

IN BOOKLET NO. 322,
we make this
statement:

"It should be remembered that because of its high strength and variety of finish, care should be exercised in fabricating ENDURO Stainless Steel. With proper equipment and adherence to the instructions contained herein, however, fabricators should experience no difficulty."



Stainless Steel has come into its own. Today, homes, institutions and business establishments of every description are using equipment and sheet metal work fabricated from this lustrous, rust-defying, sanitary metal. And sheet metal contractors who are fabricating stainless steel are realizing

substantial profits. All you need to prepare yourself to obtain your share of this business are standard sheet metal equipment, Republic ENDURO Stainless Steel and Republic Booklet No. 322. Write us for your copy. If you plan to weld stainless steel, ask also for a copy of Booklet No. 373.

REPUBLIC STEEL CORPORATION

Alloy Steel Division: Massillon, Ohio

General Offices: Cleveland, Ohio

BERGER MANUFACTURING DIVISION • CULVERT DIVISION • NILES STEEL PRODUCTS DIVISION
STEEL AND TUBES DIVISION • UNION DRAWN STEEL DIVISION • TRUSCON STEEL COMPANY



*Reg. U. S. Pat. Off.

Republic Enduro
STAINLESS STEEL



Have You Received Your "Yardstick"?

IT SEEMS evident, from requests for additional information received following our report of the National Warm Air meeting in the January issue, that a whole lot of people in this industry do not know what the "Yardstick" is.

The "Yardstick" is a booklet, written for the consumer, showing and explaining what constitutes an "excellent," a "good," a "poor" warm air heating installation.

The "Yardstick" was conceived and written by Professor Konzo of the Research Residence staff. It developed as a need from the hundreds of letters received by the staff—from home owners asking how to correct their heating system; from contractors asking "Is this correct?"—from engineers asking for a decision on "proper" or "improper"; from heating equipment manufacturers seeking advice on construction.

There are 24 pages and cover in the booklet. The preface covers the value of good house construction; the importance of the heating system; why not to buy on price alone; the need of securing a competent heating contractor; the importance of a plan and specification; the need for service; the care of a heating plant.

Then by sketches and text the booklet identifies the furnace, thermostat, humidifier, filters, blower, ducts, registers; shows the difference between steel and cast; describes how to select a stoker; how to identify an approved gas furnace or oil burner; explains the proper application of dampers, draft regulators, draft hoods for each type of furnace.

The points of difference between class A, B, C blowers, motors, controls are explained. Various control instruments and control systems are diagrammed with necessary explanation of what each control system does. Accessibility, necessary area, air sealing, etc., are explained for filters.

Class A, B, C plenum construction, duct take-offs, fire hazard elimination, duct construction

around obstructions, elbows, transitions, fittings, branch pipe takeoffs; also duct gauge, joints, dampers, duct supports, stack construction and installation, ducts through masonry walls, duct insulation, return ducts, register boxes are shown in sketches and explained by text.

The selection of the proper type of register, the location of the register, the effect of vane adjustment, proper velocity for register type and location, location of returns, are also illustrated and explained. So are methods of bringing in outside air and heating garages. And, lastly, recreation room practice and chimney requirements are discussed.

The above, in brief, constitutes the "Yardstick." How the booklet is to be used is an equally important feature.

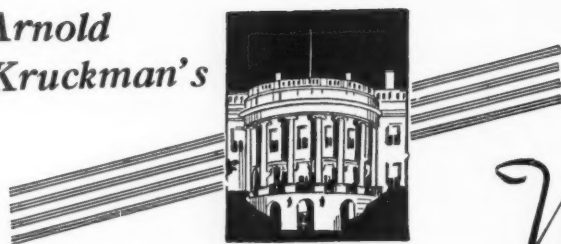
It is intended, first, to sell these "Yardsticks" to the manufacturer members of the National Warm Air Heating and Air Conditioning Association. The manufacturers, in turn, will sell or give free to their dealers, jobbers, distributors, copies of the book. Individuals may buy single copies or in quantity from the association.

This is only half the plan. To be most useful the "Yardstick" must reach the buyer. If you, a contractor, are bidding on a job and you know or suspect that some competitor is recommending an inferior system, you give the prospect a copy of the "Yardstick" and ask him to check all plans against the "Yardstick" recommendations. In this way all contractors must bid on an equally good installation. Yet there is plenty of room for variations in plans, without any skimping.

If you sell to operative builders who will not pay the price for the "best," you can agree to install a Class B (good) system and both you and the builder will know exactly what you propose to install and wherein the system falls short of "best."

Along with the "Yardstick" and complement-

(Continued on page 62)



Washington Letter

The "What" and "Where" of Defense Housing

DEFENSE housing fundamentally is the same, no matter which agency builds it. The pattern has been set by Congress which has fixed the cost per unit at \$3,000. This yardstick has been adopted by each agency no matter what variations the architects may introduce. Three thousand dollars determines the form and the materials and the equipment that goes into each unit, and where it is placed. When you bear that in mind you can see the difference is simply superficial in the plans or types put out by the Public Buildings Administration for the Army, by Defense Homes Corporation for the Federal Housing Administration, by United States Housing Administration for the Army and Navy and defense industrial communities, by the Navy for its own needs, and by the Farm Security Administration in the mushroom towns that are expected to bloom and wither with this War boom.

What's Ordered; What's to Come

Actually less than 700 defense dwelling units have been completed at this writing, late in January. The new Czar of the National Defense Housing program, Administrator C. F. Palmer, is authority for this statement. Over 29,000 units have been ordered by contract in 34 States located in 68 different communities and constituting 97 separate projects. In addition 20,000 more units are in process of being placed under contract in six additional States, and they will be located in 24 added communities and constitute 72 more projects. It is the hope that 50,000 units will be ready for occupancy about March, and that another 50,000 will be in the course of construction by April. More than half, at this time; are being built by the Navy, and about a fourth by the Public Buildings Administration for the Army, and fifth of the number are being put up by the USHA. The balance chiefly is supervised by Defense Homes Corporation with FHA support, and a small fraction by Farm Security Administration and Home Owners' Loan Board.

It may be interesting to know that only 2,000 of the homes now being built are located in industrial communities, away from military centers. Over 200,000 more defense dwellings are needed under present circumstances, and half of these cannot be located until the details of the entire defense program develop. It is hoped allocations may be made for all the 200,000 units by July 1; but by that time it is quite probable the citizens Army may have been doubled, and that there may be a considerable increase in the need for industrial defense workers; and all that spells still more housing.

Washington Hopes for "Private" Building

They have been trying to get started on defense housing since last June. One cause of delay is due to Administrator Palmer's earnest hope that private builders might be impelled to undertake the business of building low-cost houses. The present political uncertainties, and the economic uncertainties, and the fact that men like Vice-President George Williams of the Defense Homes Corporation frankly declared that cheap dwellings would wreck a community after the occasion for their need has passed, naturally checked private initiative. And on top of that, Cecil Owen, press agent for the CIO, industriously championed the use of prefabricated homes in a large way, quite frankly because it would increase employment in factories.

It was when the whole problem recently threatened to swamp the White House with growing unpleasant public attention that the President issued an Executive Order creating the Office of Defense Housing Coordinator, attached to the Executive Office of the President, and responsible only to the President, and with powers over all agencies in any way concerned with housing. The Order directed the Administrator to "eliminate obstacles which impede the expeditious provision of defense housing." Mr. Palmer, who comes from Atlanta, and who has been a leading figure in several Housing, Builders, Real Estate and

Commercial organizations of national and international scope, and who receives a salary of \$9,000 a year in the new job, apparently is making things move a little more swiftly. Like Knudsen, Hillman, Nelson, and other major figures in this defense work, he must get his green light from Mr. Roosevelt.

Prefabricated Houses on Trial

The big question of the moment here, including the White House, is whether or not the prefabricated dwelling may be the answer to the problem of the homes needed in communities that may fold up with the passing of the emergency. The big demonstration is planned for the community at Indian Head, Maryland, where the Government has built a powder factory. Manufacturers of prefabricated houses have been invited to show what they can do by supplying the 650 units required. Ten firms will contribute wood, steel and copper dwellings, with two and three bedrooms, living room, kitchen and dinette. Like an automobile, the prefabricated house is expected to self-contain all interior equipment such as bathtubs, sinks, heating plant, cabinets, refrigerators. The houses must be demountable. Apparently great things are expected of houses to be provided by the Tennessee Coal and Iron Company. Several thousands of these units may be used in Hawaii, California, Virginia, and in the dozen or more industrial towns on the verge of coming into existence.

Furnaces in Prefabricated Houses

Broadly, they closely follow the specifications of the units built by PBA. The general specification for the house built by the PBA for the Army requires concrete foundations, termite-proofed, with cement asbestos curtain walls. The exterior is wood studding, with insulation sheathing; drop siding, except when there is a second story when the construction is continued with ship-lap. The floors are hardwood, with linoleum in the kitchen and bathroom. Gutters, spouts and metal flashings are made of galvanized iron. The interior partitions are wood, the walls and ceilings are sheet rock with taped joints. The wooden windows are double hung. Each house has weather stripping. The roof of wood rafters is sheathed with felt insulation and shingled with asphalt composition. *With rare exceptions the houses are equipped with warm air coal furnaces.* These houses, invariably made of wood, average 23 feet deep by 34 feet wide. Seventy-five percent are 2-bedroom units, the other twenty-five percent 3-bedroom dwellings.

The warm air furnace is specified as "either cast iron or steel, for manual firing, available in

16- and 18-inch fire pot sizes. Installation and furnace capacity must conform with the technical code of the National Warm Air Heating and Air Conditioning Association. The furnace must be enclosed in a baked enamel, smooth or wrinkle finish, steel casing, or galvanized steel casing of not less than 26 or 22 U. S. Standard gauge material. It must have black steel or galvanized inner liner not less than No. 26 U. S. Standard gauge, with 1-inch air space. The bonnet must be a straight side type, suitable for installation of a plenum chamber and for blower operation. The furnace firebox must have a protective liner of approved fire brick, cast-iron or other suitable material, and V-shaped cast-iron baffle at flue opening."

Furnace Specifications

Later specifications provide the furnace must be capable of delivering 60,000 BTU at the bonnet when operating at combustion rate of $7\frac{1}{2}$ pounds coal per square foot of grate area with coal having content of 12,000 BTU per pound. The body must be No. 10 U. S. Standard gauge steel, with a steel head of No. 7 Standard gauge. Ash pit must be a steel plate No. 10 U. S. Standard gauge welded to prevent air leakage. Front must be one-piece cast-iron or steel, with asbestos gasket, and with self-closing firing and pit doors, 10" by 15", with metal liner and check draft doors. Feed chute must be cast-iron. Smoke curtain must be provided, smoke-outlet at rear to connect with standard 8" smoke pipe. All cast-iron parts, nickel-alloy type, must be guaranteed 20 years.

Plenum chamber must be 18 inches square, No. 26 gauge steel, finished to match casing, high enough to extend overall height to 7'-8". Plenum must have opening for automatic blower control. Furnace must be shipped set-up in crate. Blower must deliver 600 C.F.M. against static pressure $\frac{1}{4}$ " water. It must conform to rating of National Association of Fan Manufacturers, and A. S. H. V. E. code. Impeller wheel, multiblade type, 10" by 10", statically and dynamically balanced. V-belt drive, split phase motor, rubber mounted, 115 volt, single phase, 60 cycle, A. C., with thermal overload protection. The blower control with fan switch operated by bonnet thermostat shall be adjustable over a range of 90 degrees to 180 degrees F. with 25 degrees differential, and with electrical capacity to control fan switch without use of relay or starter.

Navy housing is built in single or duplex units of special construction. Units range from 2 to 4 bedrooms. Dwellings are equipped with stoves, cabinets, refrigerators, hot and cold water appliances, forced warm air heating systems, and

(Continued on page 110)

20 Ways

To Keep Your Taxes at a Minimum

By Arthur Roberts

TAXES are today a major expense and the sheet metal contractor or air conditioning dealer should take every lawful and permissible means to keep them at minimum. These 20 suggestions, based upon extensive experience on contractor and dealer accounts, should be helpful in effecting tax economies.

1. Make each year's tax return complete in itself. Expenses and liabilities overlooked in one year cannot be deducted from the income of the next.

2. Do not wait until the day before filing time to prepare a return. In the haste, essentials to tax economy may be overlooked. Omissions are costly.

3. If returns are made on a cash basis, try to pay all current bills during the taxable year so that the expenses may be deducted from the income for that year. Sometimes, the economies thus effected make it advisable to borrow money to meet these obligations.

4. If returns are filed on an accrual basis, all accrued items, which are expenses due but not yet paid, should be pro-rated to the end of the taxable year and deducted.

5. Loss incurred in any business transaction is ordinarily deductible from gross income, providing it is a closed transaction during the taxable year with full consideration for salvage and other compensation received.

6. Deduct sufficient depreciation. A taxpayer is NOT permitted to take advantage in later years of his prior failure to take any depreciation allowance or to adjust an inadequate allowance made under the known facts of prior years. The computation of depreciation is more an accounting problem than one of tax. Use the method that most accurately reflects wear and tear. A taxpayer is not limited to any one method as long as the depreciation allowance is reasonable. If a taxpayer wants to switch from one method to another, it is necessary to get the consent of the Commissioner of Internal Revenue.

7. Do not depreciate land. Deduct the cost of the land from the value of the real estate if land and building are combined on the books.

8. Deduct for obsolescence whenever permis-

sible. That which shortens normal life is obsolescence. In these fast-moving days, equipment may become obsolete faster than it depreciates from ordinary wear and tear. There are two kinds of obsolescence, accrued and anticipated, the latter deductible annually with depreciation. Accrued obsolescence sometimes called forced obsolescence, may be deductible in full, being the difference between the depreciated cost of an asset and its salvage or trade-in value. However, such deductions are usually incidental to renewals and replacements.

9. Deduct for equipment scrapped to make room for modern units in the showroom or repair shop. The tax economies possible through such deductions are additional to the other monetary advantages of modernization. Loss through the demolition of all or part of a building incidental to modernization may be deductible from gross income.

10. Figure inventory or merchandise and supplies at cost or market, whichever is lower. If your inventory is inflated, profits will be higher on paper, but taxes higher in real money.

11. Do not capitalize maintenance expense. For example, a dealer may charge a repair bill of \$150 to a property account. Considers it an expense or does it because it increases the value of his assets, thus making his balance sheet look sweeter. Such entries increase tax. Repairs that keep a property in ordinarily efficient operating condition, are an expense. There are borderline cases of this type, which may be considered an increase in capital or an expense. Be conservative in capitalizing all items, which logical argument will support as expenses. This will keep down tax.

12. Accounts paid because of injuries received by employees are proper deductions as expenses, limited to the loss not covered by insurance or otherwise.

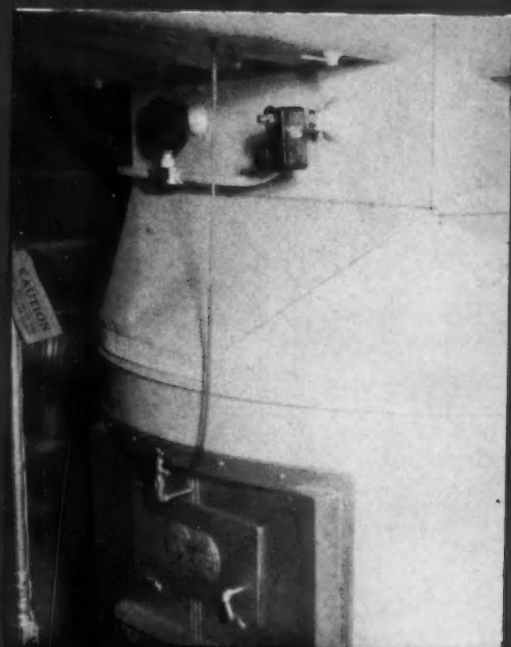
13. Keep accurate accounting records. Faulty bookkeeping procedure makes tax economy difficult. Often small expenses are paid out of cash and never recorded, hence, may not be deducted from gross income. In the aggregate, over the

(Continued on page 113)

AMERICAN ARTISAN

RESIDENTIAL AIR CONDITIONING

S E C T I O N



DEVOTED TO HOME AND SMALL COMMERCIAL AIR CONDITIONING

Pacific

27 SUCCESSFUL YEARS . . . AND STILL GROWING!

BEAT COMPETITION WITH THIS LOW COST FORCED-AIR FURNACE

Capacity for All Heating and Ventilating Requirements

ADAPTABLE to successful solution of the most difficult combination heating and air-conditioning problems in all types of buildings, this compact, efficient, low cost "Pacific"-Manufactured Gas-Fired Furnace is available in a complete range of sizes from 55,000 to 660,000 B.T.U. input. Unsurpassed performance has won acceptance everywhere for Model 8SFB, with sales rapidly increasing.

NEW TYPE HEATING ELEMENT

AN innovation in gas furnace design and construction is the round combustion chamber and radiator of heavy rust-resisting steel welded into a one-piece gas-tight leak-proof unit.

HIGHER EFFICIENCY, LONGER LIFE

SO RAPID is heat transference that through this element the maximum heating power is reached a moment after the gas is turned on. This is accounted for by increased effective radiation area, increased air flow, longer combustion travel, and the all-steel construction. These factors, together with the "Pacific" venturi-type round burner, combine to extract the maximum heat units from the fuel consumed and transmit them to the inner warm air passages in the shortest possible time. Heat emission is constant throughout the performance range.

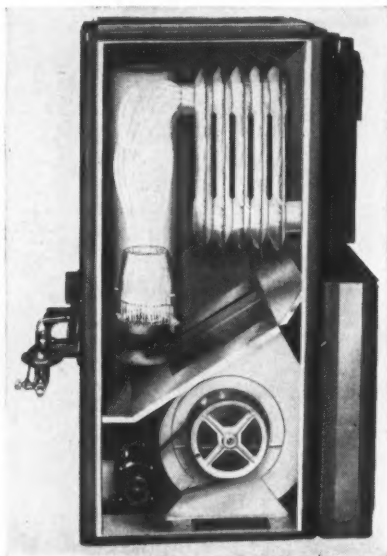
QUIET, POSITIVE AIR DELIVERY

THE BLOWER is a powerful improved multi-blade type, equipped with Fafnir "Life-Time" lubricated steel ball bearings (no oiling required) and mounted in rubber pillow blocks for quiet operation. Variable speed adjustment permits change in air volume for winter and summer.

CORRECT SIZE FOR EVERY NEED

AS the Heating Element is of the sectional type, any number of elements may be assembled in the one casing to provide a furnace size for any requirement. When assembled in multiples, an interconnecting passageway permits flame travel from the pilot to each burner successively.

WRITE today for complete details . . . step up sales and profits with this and other popular "Pacific"-Manufactured Gas-Fired Furnaces—a complete line!



ABOVE: View of all-steel heating element. Heavy round combustion chamber and special radiator are welded into a one-piece leak-proof unit.

ABOVE: Venturi-type round burner with primary air adjustment. Raised flame tips permit scientifically perfect secondary air and gas mixture. Above the burner is a heavy cast-iron fire-box liner.

Get In On The "DEFENSE" BOOM!

★ "PACIFIC" Unit Heaters for overhead installation in large open areas, and Duct Furnaces for use in industrial and commercial plants, qualify for "Defense" contracts in a big way! Their installation in the great airplane plants of Douglas, Lockheed, Vega and Vultee, and in other plants such as General Motors, Los Angeles, is a selling background that should bring you big business! Write NOW for full information!

PACIFIC GAS

RADIATOR CO.

MAIN OFFICE AND FACTORY

HUNTINGTON PARK, CALIF.

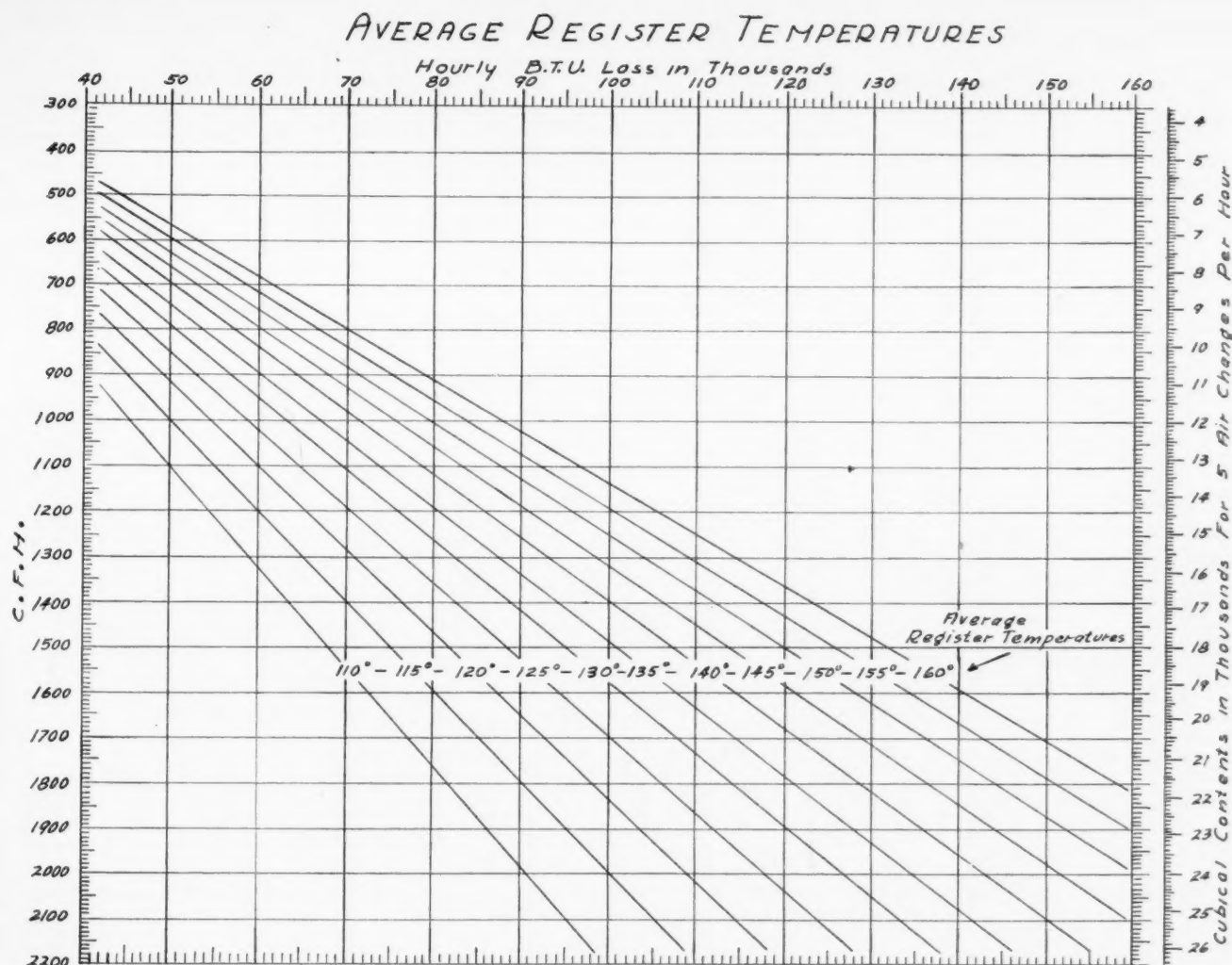


Fig. 1—Average Register Temperature Chart. To use, select total house Btu loss at top; follow this line down to proper line running right from total CFM; the intersection shows the average register air temperature.

Technical Code—*Precalculated* [Part 4]

By Henry Aronson

Field Engineer, Premier Furnace Co.

THE January article showed the complete heat loss calculations for the building under discussion. The next step is to determine the amount of air necessary to distribute the heat properly and evenly.

The first thing that must be done is to find the design temperature. Article 5, Section 1, of the Technical Code specifies a minimum of 5 air changes per hour. Under certain conditions, a more rapid turnover is advisable, but for a house such as this one, 5 changes are sufficient. The code's method of determining the air requirements is to multiply the cubical contents by the number of air changes and divide by 60. In this case it would be multiplying by 5 and dividing by 60, which is the same as dividing by 12. This is simpler, and dividing 8786, the cubical

contents, by 12, shows that a minimum of 732 CFM is necessary.

After the CFM requirements have been found, the design temperature is obtained by referring to the average register temperature chart, Fig. 1. The CFM scale is at the left, and the BTU loss scale (total Hourly BTU loss) is at the top. At the right is a cubical contents scale for use when 5 air changes are desired. In this case it is unnecessary to figure CFM as the design temperature can be read at the intersection of the cubical contents line and the BTU loss column.

However, as there are times when 5 changes will not suffice, it will be better to demonstrate the use of the chart on a CFM basis. Simply read along the 730 CFM line to the 57,000 BTU column (closest to actual figure). This intersection

HEATING CONTR. Allweather Conditioning Co. OWNER M. Hurden DATE 11-15-40
 ADDRESS _____ ADDRESS 712 Pawhattan Dr.
 CITY Chicago Ill. CITY Edgebrook, Ill.
 EQUIPMENT _____ FUEL Coal TEMP. DIFF. 80 REGISTER LOC. Base DESIGN TEMP. 145 BONNET TEMP. 150

Room Dimensions	Cubical Cont.	Crackage	Exp Wall	Glass	Net Wall	Exp Floor	Exp Ceil.	ATTC WALL	B.T.U. Per Deg. T.D.	Equiv. Length	Reg. Temp. C.F.M.	Rnd. Pipe Corr.	Rect. Duct	Val. Reg.	Equiv. Length	Rnd. Pipe Corr.	Rect. Duct	Val. Reg.
<u>Living</u>		<u>39</u>	<u>49</u>	<u>48</u>	<u>393</u>	<u>297</u>	<u>42</u>		<u>185</u>	<u>3</u>	<u>150</u>							
<u>21' x 13' x 9'</u>	<u>2673</u>	<u>27</u>	<u>441</u>	<u>55</u>	<u>75</u>	<u>24</u>	<u>3</u>		<u>93</u>		<u>93</u>							
<u>Kitchen</u>		<u>40</u>	<u>35</u>	<u>38</u>	<u>187</u>	<u>119</u>			<u>117</u>	<u>21</u>	<u>145</u>							
<u>12' x 9' x 9'</u>	<u>1069</u>	<u>28</u>	<u>225</u>	<u>43</u>	<u>36</u>	<u>10</u>					<u>124</u>							
<u>Dining</u>		<u>19</u>	<u>24</u>	<u>24</u>	<u>192</u>	<u>144</u>	<u>36</u>		<u>93</u>	<u>17</u>	<u>145</u>							
<u>12' x 11' x 9'</u>	<u>1294</u>	<u>13</u>	<u>216</u>	<u>38</u>	<u>37</u>	<u>12</u>	<u>3</u>				<u>99</u>							
<u>Vestibule</u>		<u>21</u>	<u>55</u>	<u>19</u>	<u>31</u>	<u>30</u>	<u>18</u>		<u>46</u>	<u>22</u>	<u>145</u>							
<u>5' x 5' x 9'</u>	<u>272</u>	<u>15</u>	<u>50</u>	<u>22</u>	<u>6</u>	<u>2</u>	<u>1</u>				<u>60</u>							
<u>Bedroom #1</u>		<u>26</u>	<u>24-168</u>	<u>27</u>	<u>150</u>		<u>216</u>	<u>175</u>	<u>132</u>	<u>29</u>	<u>140</u>							
<u>10' x 10' x 9'</u>	<u>1728</u>	<u>18</u>	<u>23-184</u>	<u>30</u>	<u>28</u>		<u>17</u>	<u>39</u>			<u>149</u>							
<u>Bath</u>		<u>13</u>	<u>7-86</u>	<u>7</u>	<u>49</u>		<u>35</u>	<u>40</u>	<u>39</u>	<u>29</u>	<u>140</u>							
<u>7' x 5' x 8'</u>	<u>280</u>	<u>9</u>	<u>5-40</u>	<u>8</u>	<u>9</u>		<u>3</u>	<u>9</u>			<u>44</u>							
<u>Bedroom #2</u>		<u>18</u>	<u>12-100</u>	<u>18</u>	<u>91</u>		<u>156</u>	<u>127</u>	<u>91</u>	<u>33</u>	<u>140</u>							
<u>10' x 10' x 9'</u>	<u>1250</u>	<u>13</u>	<u>17-186</u>	<u>20</u>	<u>17</u>		<u>13</u>	<u>28</u>			<u>102</u>							
<u>Hall</u>			<u>8-4</u>		<u>44</u>		<u>28</u>		<u>11</u>									
<u>5' x 5' x 8'</u>	<u>220</u>		<u>44</u>		<u>9</u>		<u>2</u>											
<u>Living Reg. #2</u>									<u>92</u>	<u>33</u>	<u>145</u>							
											<u>98</u>							
TOTALS	8786	124		206	217	48	42	76	713		769							
										B.T.U. Per Deg. T.D. <u>713</u> x T.D. <u>80</u>	Total B.T.U. <u>57,040</u>							

Fig. 2—Data Sheet. These Data Sheets are being filled in progressively as the articles appear. This article covers filling in the column of actual register temperatures.

occurs between the 145 and 150 degree diagonal lines, which represent the average temperatures. Use the lower temperature when the point of intersection is between two of them. Here the design temperature is 145 degrees which is placed in the space for it at the top of the Data Sheet, Fig. 2.

When this has been done the actual length of the runs must be found.

First a tentative line drawing and layout of the warm air side of the system is made as shown on the house plan, Fig. 3. The procedure is described in Article 6 of the code and consists of simply scaling off the actual lengths of the runs and adding the rise to the registers and any other rises or drops in the duct. When spotting locations in the living room, it was obvious that two outlets were necessary. Scaling these off, the shorter one is 2 feet from the plenum chamber and has a 1 foot rise to the baseboard register, making a total of 3 feet, and the farther one has 22 feet of ductwork and a 1 foot rise, or 23 feet in all. The other register distances are scaled in the same way and the lengths are written in the equivalent length spaces as shown on the data sheet. The reason for this will be apparent when the equivalent lengths are calculated.

When all the actual lengths have been entered, the register temperatures and bonnet temperature may be worked out. For the bonnet tem-

perature, divide the longest run, which is 33 feet, by 2, making 16½ feet. The temperature drop for 16½ feet must be added to the average temperature to obtain the bonnet temperature (see Article 6, Section 2, Item d). In order to compute this, a ¼ degree per foot temperature drop may be assumed for this type of system (Article 6, Section 2, Item e). Referring to the temperature drop chart, Fig. 4, read down the actual length scale to 16½ feet and across to the ¼ de-

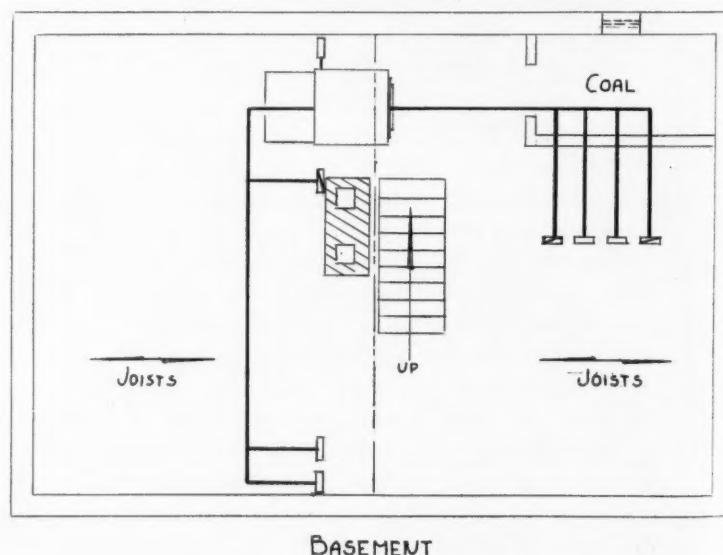


Fig. 3—Typical single line duct sketch on which actual distances from bonnet to registers are measured.

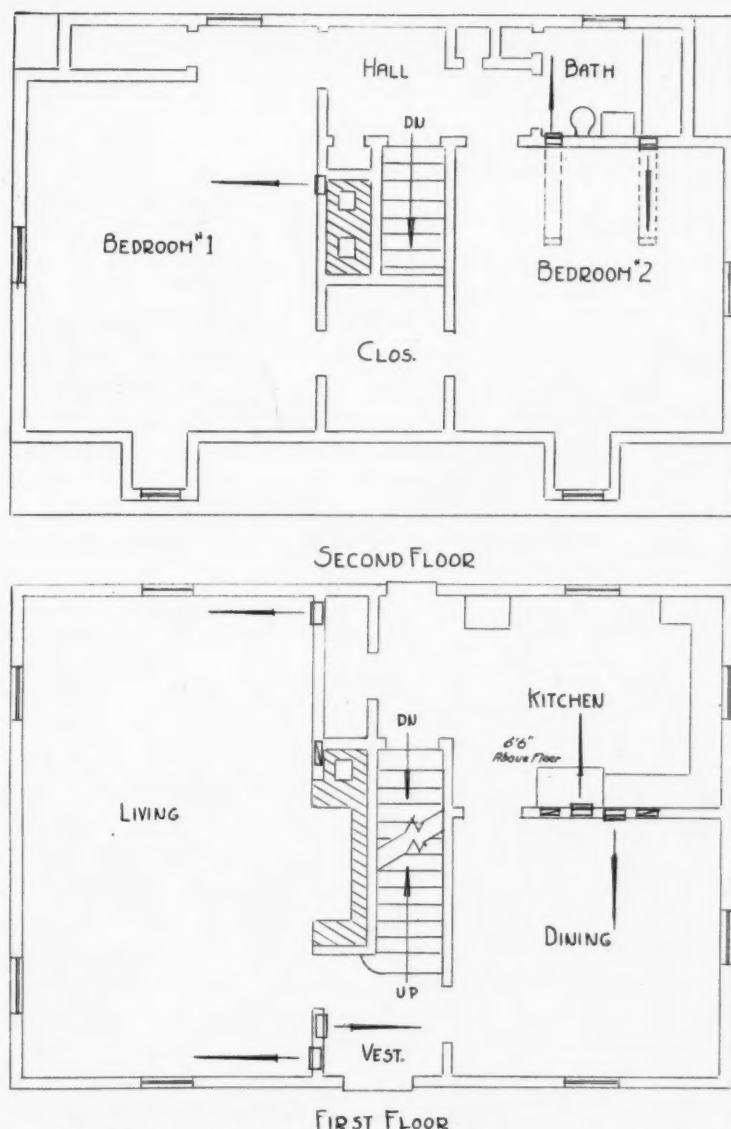


Fig. 3—First and Second floor plans prepared to show location of registers so that the basement piping sketch can be prepared.

gree drop column. This shows slightly over 4 degrees temperature drop for the 33-foot run. In order to keep all temperatures in 5 degree variations, use 5 degrees and add this to the average temperature, 145, making a bonnet temperature of 150 degrees. This is noted in its proper place at the top of the data sheet.

Now that the bonnet temperature has been taken care of, the register temperatures may be found. Again using the temperature drop chart, Fig. 4, and taking the living room as an example, it will be seen that one of the registers has an actual duct length of 3 feet. The temperature drop here is negligible, so this register temperature will be 150 degrees the same as the bonnet.

Right—Fig. 4—The Technical Code uses actual register temperatures obtained by deducting $\frac{1}{4}$ -degree temperature drop for each foot of actual distance between bonnet and register. To use, lay a ruler across the two distance scales and read temperature drop.

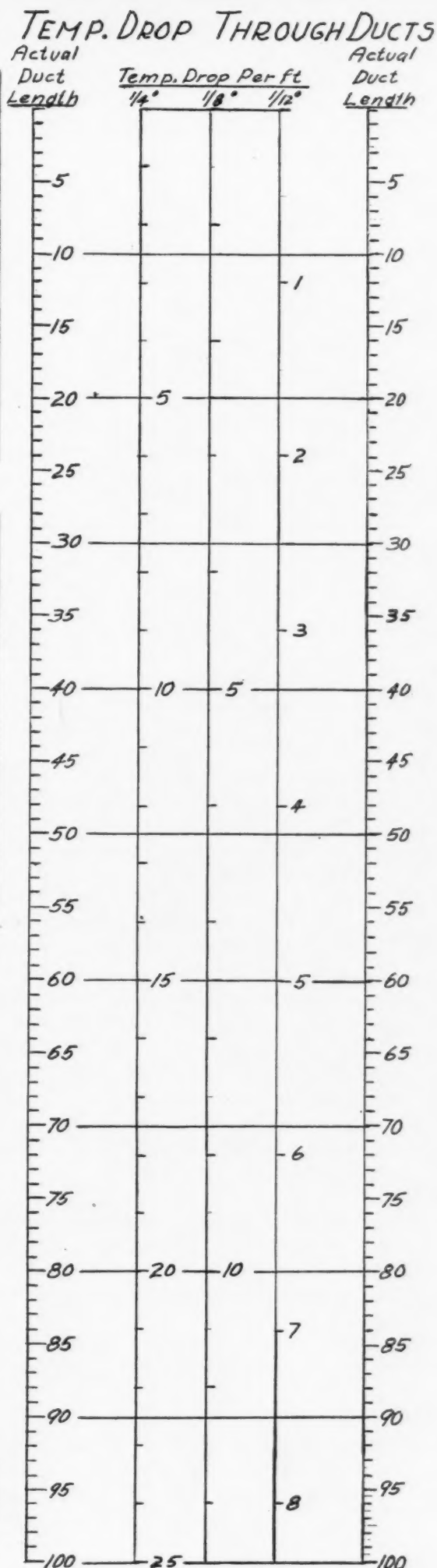


FIG. 5—C.F.M. REQUIREMENTS

[illegible]

This is the highest register temperature that should be used and whenever any registers work out higher than this they must be sized for 150 degrees, and if possible the bonnet temperature adjusted accordingly, even though it means more air changes per hour.

The other living room register has a duct length of 23 feet. Reading from the chart shows a little over a 5 degree drop, so the temperature for that register will be 150 degrees less 5 degrees, or 145 degrees. The same idea is carried out for all the registers and the actual temperatures are placed in the spaces of the Data Sheet. It should be born in mind that it is seldom that these temperatures will occur in actual practice. The bonnet temperature varies continually during the fan operation and is affected by operating time, firing, etc. In mild weather they will be lower as a rule, and in severe weather will run considerably higher.

Chart for CFM

After the register temperatures have all been entered on the Data Sheet, the necessary CFM may be read from the CFM requirement chart, Fig. 5. This particular chart was the first one the writer worked out as it covered that part of design that took the most figuring. Fig. 5 is probably the most useful of all the charts. It will be noticed that there are five temperature difference scales at the left of the chart. These are most often used by the writer in the territory he plans jobs for. Scales for other differences can easily be worked out and applied to the chart, or correction factors can be used. *[If there are sufficient requests for other scales, they can be published at a later date.]*

In using this chart, the scale marked by the proper temperature difference is selected. Here the 80 degree scale is used. The figures on the scales represent the BTU losses per hour per degree difference, as have already been noted on the Data Sheet. For the living room, the loss has been divided between the two registers, 93 BTU for the short run, and 92 for the long run. To obtain the CFM read down the 80 degree temperature difference line to 93 and across to the 150 degree register temperature column, which gives 93 CFM also. For the other register read across the 92 BTU line to the 145 degree column, arriving at 98 CFM. The other registers are checked in the same manner, and the answers are written in on the data sheet.

The heat loss was combined for the vestibule and hall as one register at the foot of the stairs will take care of both of these. For purposes of demonstration, the vestibule and bathroom are being treated as ordinary exposures, but based

on the writers experience, it is advisable to over-size these exposures by at least 20%. When all the CFM quantities have been entered, they should be added together to make sure they total at least as much as the minimum CFM previously figured. For this job, the total, 769, is well over the minimum, 732.

Two columns at the right of Fig. 5 will also be seen. They show leader areas for first and second floor gravity requirements. These serve a double purpose: first, for figuring leader area after obtaining the heat loss in the regular way. They are read the same as the CFM columns. Secondly, they may be used where a job has already been figured according to the Standard Code, which is a specialized BTU method. In this case it is possible to read back from the leader area columns to the CFM columns. Suppose, for example, a first floor room has been figured to need 70 square inches of leader pipe area. Reading back from this to the proper register temperature, say 135 degrees, a 115 CFM air delivery is required to supply the same amount of heat.

Having obtained the CFM requirements, the next article will take up the sizing of the ducts to carry the air.

Before closing this article, perhaps a few comments will not be amiss, as they are on points that affect the subjects covered herein. The writer has consistently taken the attitude that the code is at present the most logical approach to a standardized and thorough method of calculating, but does not view it as a satisfactory final result, and believes it definitely needs improvement, simplification, and clarification.

One of its ambiguities affecting this discussion is that CFM requirements and duct sizes demand a tentative layout before they can be determined, and until they are determined, it is impossible to know exactly how many outlets are necessary. Before duct sizes are known, it is often impossible to tell where a duct or stack may be run, so the situation is that, on a basis of theory, the layout cannot be made until the requirements are known, and the requirements cannot be found until the layout is made. Naturally the designer's judgment and experience will usually avoid any real difficulty on this account, but there are times where it will have its disadvantages.

Another point important to all of us in the industry, is the prevailing attitude, or perhaps lack of attitude, that the building industry has towards heating. The house in this article has been assumed to follow FHA specifications, but even so, wide variations may be encountered among contractors, localities, and FHA inspec-

(Continued on page 118)

Zoned Heating—*California Style*— With a Furnace to Each Zone

By Platte Overton

Multi-furnace systems (gas-fired, primarily) are receiving some acceptance in the Middle-West and East—but in California this idea has been commonplace for many years. The practice is to use one furnace to each zone and use many small furnaces in place of fewer large units. This is a typical "big" house installation.

SEVERAL items tend to make the design of mechanical warm air systems for Southern California different from the designs popular in the East or Middle West.

First—Gas is used for fuel in 99 per cent of the installations. Solid fuel furnaces are assumed to have a rating at from 3 to 5 pounds of fuel burned per square foot of grate per hour and when the need arises it is possible to burn 10 or 12 pounds in severe weather and increase register temperatures from 20 to 50 degrees.

Gas-fired furnaces, on the other hand, have a definite combustion rate fixed by the A. G. A. A 90,000 Btu furnace will burn 90,000 Btu and no more. Hence all design calculations must be exact.

Second—People are inclined to shut the entire system off at night and the entire house may be reduced to practically outdoor temperature, or 35 to 40 degrees. People in the East or Middle West maintain 60 to 65 degrees at night and have a morning heating load pick-up of 5 to 10 degrees in place of the 30 to 40 degrees experienced in Southern California.

Third—Due to termite control, the entire house must be vented underneath and the heating unit and ducts are exposed to out-of-doors temperatures.

Fourth—There are no full basements and long runs of pipe are the rule rather than the exception.

Fifth—Rooms are large; living rooms 26 by 36 feet are not unusual. Ceilings are high and glass surface is high in ratio to wall surface.

Sixth—No special thought is given to heating by the designers or architects, hence partitions above one another are practically unknown. Walls must be strongly braced due to earthquakes so partitions are full of cross members. Insulation is rare and weather strip would bring criticism

from garrulous climate fiends. It is only fair to point out a few advantages.

There are no strong prevailing winds. Sun effect is high even during winter months and heat may usually be cut off after 10 A. M. Finally, the best fuel in the world—1100 Btu natural gas—is not expensive.

The average yearly relative humidity is 50 per cent.

Heavy underwear is for mountain climbers only and the light clothing worn causes temperatures of 40 to 45 degrees to feel like zero.

Lastly, there is the problem of selling any heat at all—homes costing up to \$250,000 have been built without heat of any description, barring fireplaces, and good fireplace wood is \$26.00 a cord.

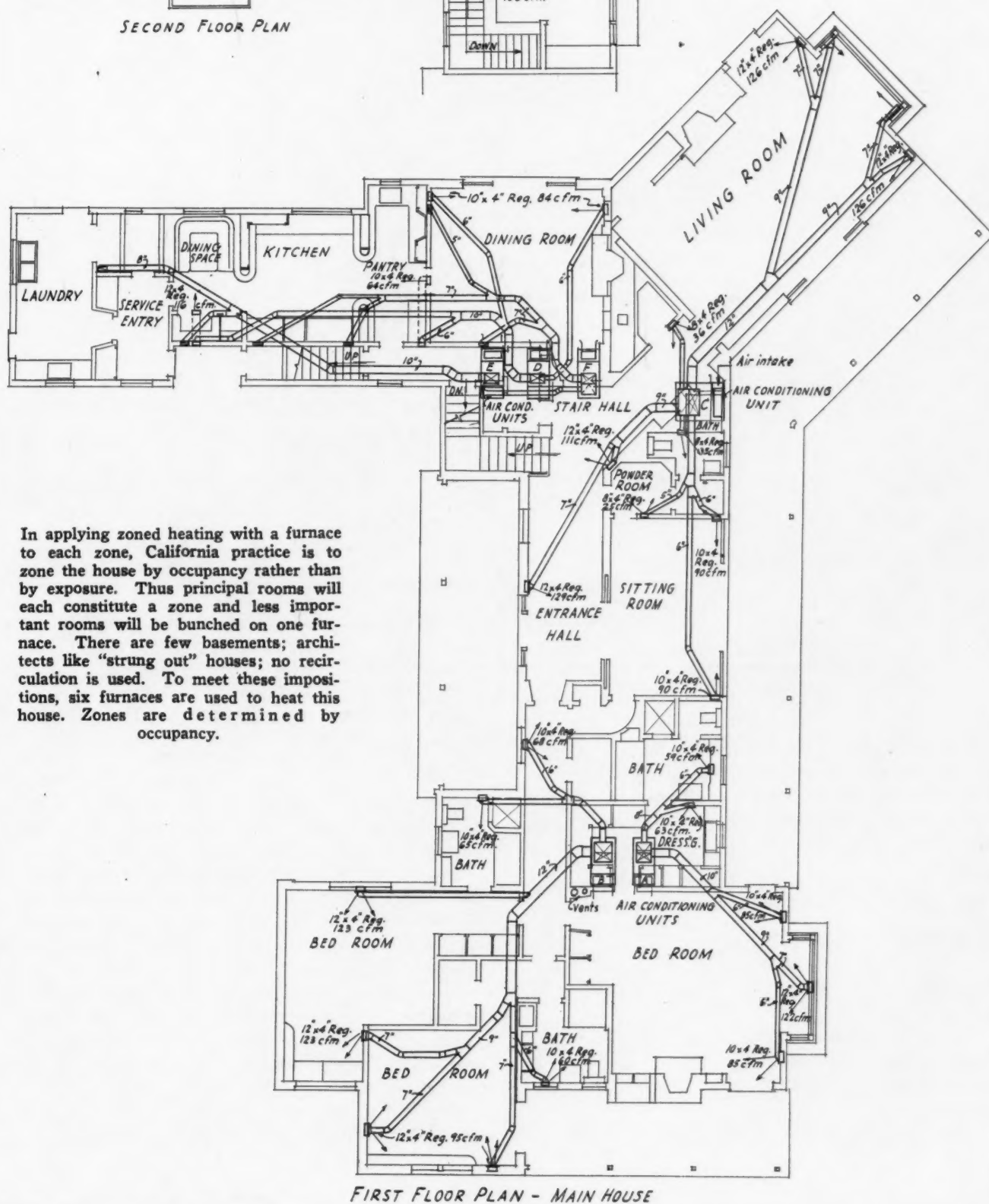
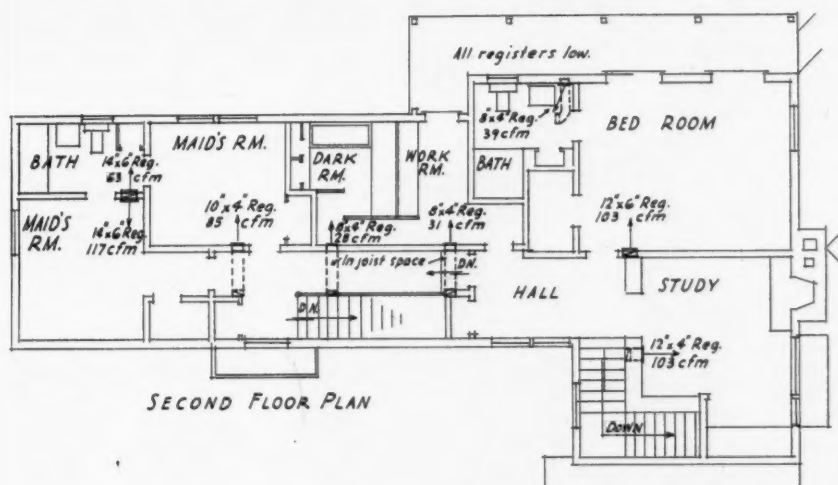
Before the advent of the forced warm air system, the unit system of gravity heating was popular. Many such systems remain today and are giving satisfactory service after 10 to 15 years. They were installed in a series of excavations or tunnels under the building and there was generally a complete unit for each room. All the air was taken from outside.

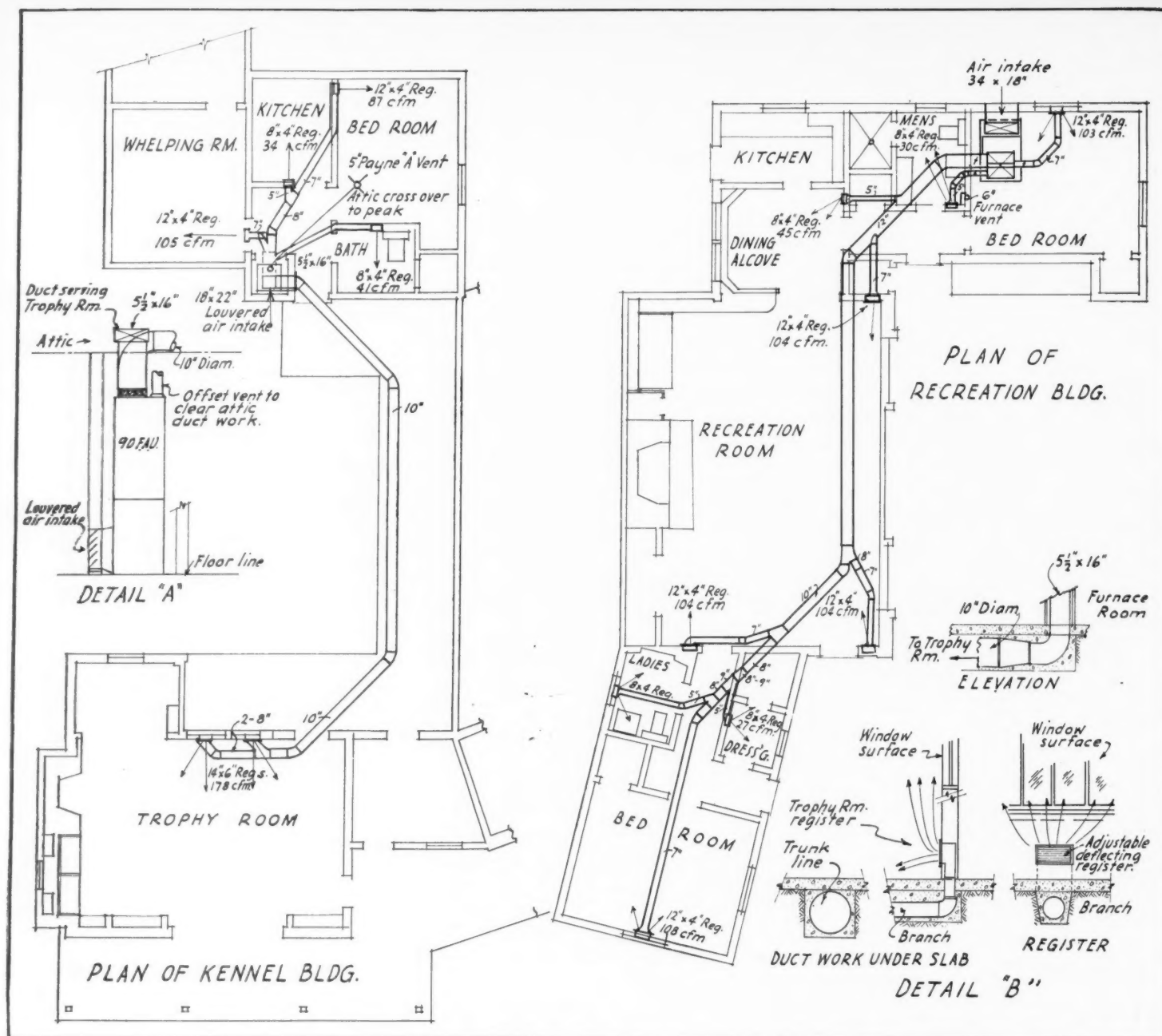
The installation shown here required consideration of most of the foregoing items. Figuratively, there are no basements. Areas for furnaces and tunnels connecting them will be noted—the system is considered as "zoned"—one unit for bedroom 2 and 3 and the baths and another unit for bedroom 1 and dressing room and bath.

The master bedroom has a separate unit while the other bedrooms and guest rooms are arranged with two or more similar rooms on one unit.

One large unit serves the living room, sitting room, entrance hall and powder room, while another is provided for dining room, etc.

There is a second floor over the right wing of the house with servants' quarters and bedroom





The Recreation building and the Kennel building are separate structures; each with its own heating system. In the Recreation building the longest pipe is about 75 feet; in the Kennel about 55 feet. Pipes are carried in tunnels as shown in the details. Note throughout this installation the use of registers directly under the windows, or in outside walls.

No. 4, each section having its own unit.

Returns are not used and the furnaces must be large enough for the Btu loss of the rooms plus the necessary temperature rise of outside air to room temperature. The over-all load is $c.f.m \times 103$

= Btu input.

75

While the units are 75 per cent efficient, 5 per cent per 1000 feet of elevation is deducted for installations above sea level. Five to 7000 feet is not unusual.

There is another section called the recreation building near the swimming pool—it serves as a guest house and has its own separate heating system.

Long runs as shown in this installation are in-

sulated with 3 layers of 1/4-inch air cell asbestos and one layer of 10-pound paper, plus muslin. Heat loss from ducts still remains high and 60 to 70 feet is about the maximum of length for good practice.

The owners of this estate are famous dog fanciers and breeders and the kennels are heated by the same type of automatic heating unit as the main house. The unit is the closet type as no basement is provided. The trophy room run is under or rather in the concrete slab. Ground temperatures in this part of the country are fairly warm and the actual heat losses in concrete covered ducts under houses is not as great as those on ducts in attics or under floors.

The entire system is now going through the third winter and has been highly successful.

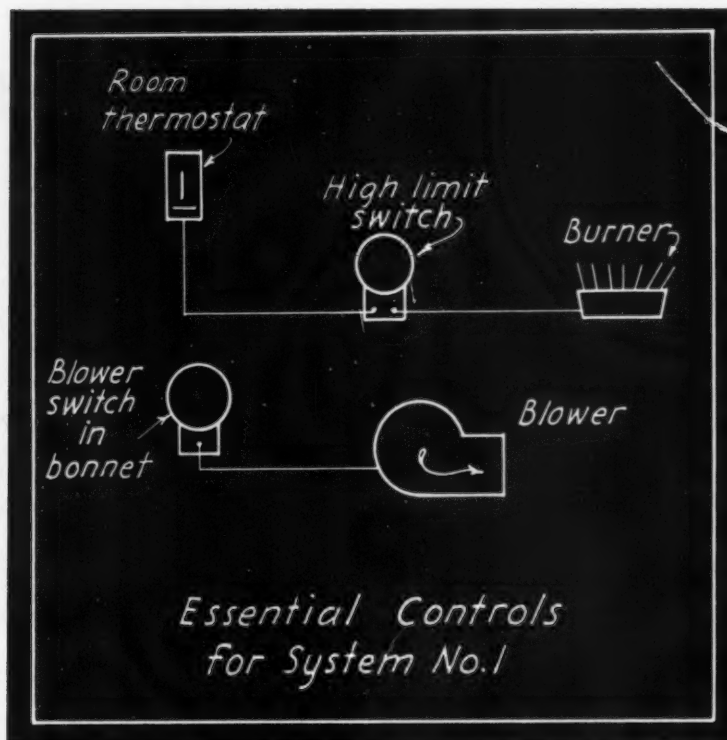


Fig. 1—The basic forced air control system in simplified diagram. All additional instruments are only safeguards or refinements, or economizers. In this system the thermostat starts and stops the fire, the fan switch starts and stops the fan.

AUTOMATIC CONTROLS

For Forced Air Heating Systems [Part 2]

By S. Konzo

Special Research Assistant Professor,
Engineering Experiment Station, University of Illinois

Part I of this discussion appeared in the January, 1941, issue. The author seeks to show that there are only two basic control systems—but an infinite number of minor variations created by the use of different types of instruments. These instruments, however, serve only as protection or refinements of the basic systems.

QUESTION 24.—In control system No. 1, what prevents the blower from operating when the bonnet air temperatures are low?

ANSWER 24.—You can see from Fig 3 that the blower operates between definite fixed limits of bonnet air temperatures. The blower stops when the bonnet temperature reaches the lower limit b' , and thereby avoids the possibility of blowing cold air into the rooms.

QUESTION 25.—When I set the pointer or indicator on a blower switch at 175 deg., am I actually setting an upper limit, a' , of say 175 deg., and at the same time the lower limit, b' , of say 140 deg.?

ANSWER 25.—That's right. The same thing occurs when you set the pointer or indicator on the room thermostat at say 72 deg. Actually, you set an upper limit, a , of say 73 deg. and a lower limit, b , of say 71 deg. in one movement of the pointer. Whether you realize it or not, every time that you move the pointer, you are moving both the upper and lower limits of temperatures. In other words, you move the entire *range* of temperatures.

QUESTION 26.—Can this range of bonnet air temperatures be increased or decreased?

ANSWER 26.—In most blower switches, internal adjustments can be made to either widen or

narrow the range.

QUESTION 27.—What happens when the range of temperatures is made narrow?

ANSWER 27.—If the range of temperatures, $a'b'$ in Fig. 3, is made narrower, the blower cycles more frequently; that is, the blower operates a larger number of times during a given period of time. More frequent cycling of the blower will tend to *decrease* the under-runs and over-runs in room air temperature. However, if the range is *too narrow*, the blower may operate *too frequently*, and the resulting operation may be objectionable from the standpoint of increased power costs due to the heavy starting load, and also from the standpoint of abuse of the blower motor and the blower equipment. See Fig. 4.

QUESTION 28.—Now what happens if the range of bonnet temperatures is widened?

ANSWER 28.—If the range of bonnet temperatures is made *too wide*, by changes in the internal adjustment of the blower switch, then the room temperature over-runs may be increased. Also the large cyclical variations in the bonnet temperature may result in gravity action during the off-periods of the fan, that may result in difficulty in maintaining a bal-

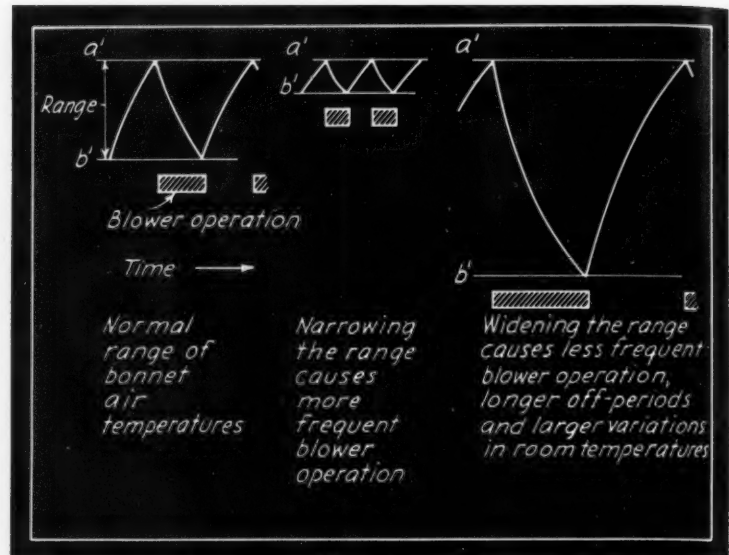
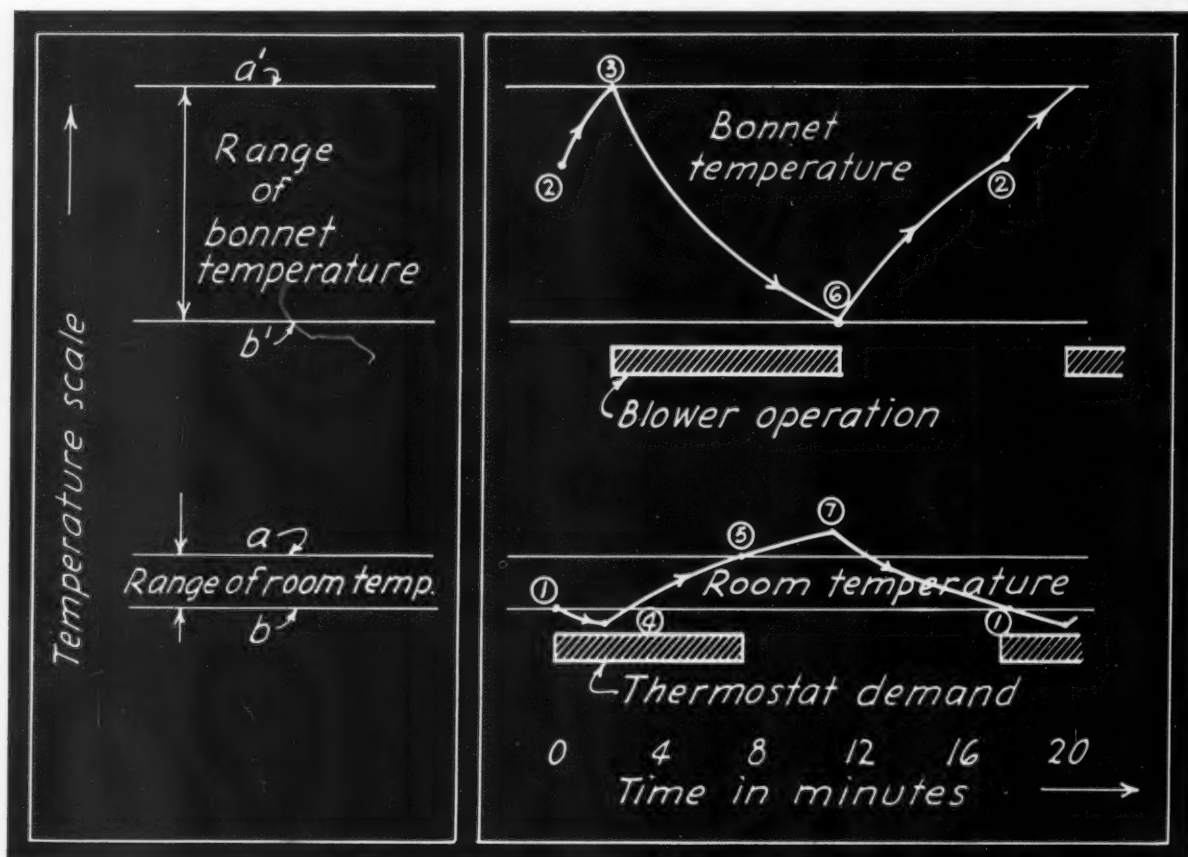


Fig. 4—Effect of narrowing and widening the bonnet temperature instrument. Note how fan operations shorten or lengthen in running time with these changes. Too wide and two narrow ranges are not satisfactory (see text).

anced distribution of heat to the various rooms of a house over a wide range of weather conditions. The usual range of bonnet temperatures is of the order of magnitude of 30 to 40 deg. F. Unless more frequent cycling of the



Left, Fig. 2. Right, Fig. 3—Temperature cycles of bonnet air and room air.

blower is desired, it is not advisable to change the factory setting of the range.

QUESTION 29.—Suppose that in a given furnace plant, I do not change the factory setting which governs the range of bonnet temperatures, but merely move upwards the indicator, or pointer, on the blower bonnet switch?

ANSWER 29.—As indicated previously, when you move the pointer on the fan switch you are shifting the upper and lower limits of the bonnet temperature range simultaneously. Hence, if the indicator or pointer on the blower switch is moved from 150 deg. to 175 deg., you will obtain a higher *average* bonnet temperature, as the primary result. This higher average temperature will, in turn, result in shorter periods of blower operation and longer periods

difficulty of this method of operation is that the plant cannot be balanced satisfactorily so that the rooms will be equally heated for a wide range of weather conditions. If the duct system is not properly designed, and the frictional resistance of the ducts to second story rooms is excessively large as compared with those of the ducts to the rooms close to the furnace, the plant may be difficult to balance when the blower is operating continuously and it may be found that the use of high bonnet temperatures will give some gravity action and hence a better proportion of heat to the upper rooms. This condition may arise particularly in the case of a gravity system which has been converted over to a forced-air system without suitable changes in the warm air and cold air duct system. In general, however, if the system cannot be operated satisfactorily when the blower is operating continuously the duct system itself needs some correction. Increasing the bonnet temperature in an attempt to secure a better balance of room temperatures is hardly the proper solution.

QUESTION 31.—Why do some heating contractors attempt to correct an unbalanced system by raising the bonnet switch indicator?

ANSWER 31.—If the contractor would design and install by the Technical Code of the National Warm Air Heating and Air Conditioning Association the system would operate as designed, and that is as a forced warm-air system. In answer to your specific question, I believe the action is a hold-over from gravity heating experience. In an unbalanced gravity system, it has been common practice to raise the bonnet thermostat indicator, so that the bonnet temperature would increase to a value high enough to get some sluggishly acting pipe to warm up and start pulling air. Even in gravity work, however, such steps would not be necessary if the systems were layed out and installed correctly, as specified in the Standard Code of the National Warm Air Heating and Air Conditioning Association.

Personally I don't like the attitude of some heating contractors, who say that it's too much trouble to design a plant according to the code, and yet they will spend days in an attempt to make the plant balance *after* they have put it in. They increase the fan speeds, move the bonnet switch settings up beyond a normal value, and damper the system to death merely to take care of a single duct of excessive resistance that could have been designed correctly in the first place. But let's not take up the abnormal cases. Let us confine our discussion to a normal system.

(Continued on page 108)

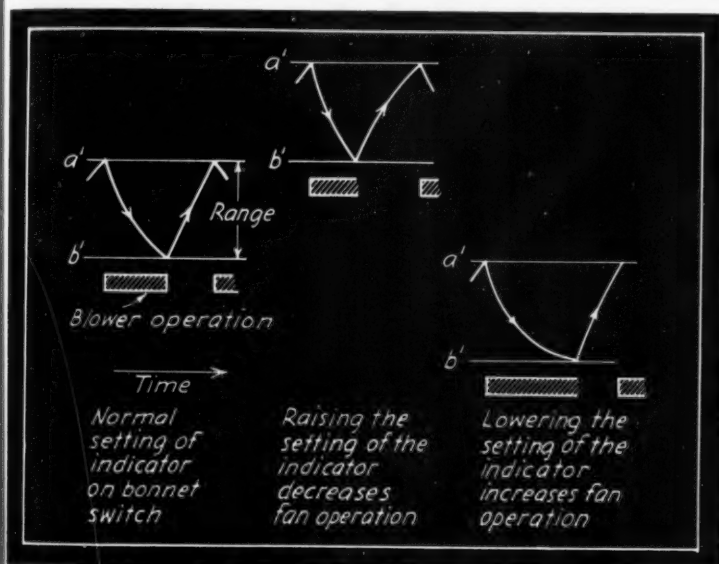


Fig. 5—Raising and lowering the temperature at which the fan starts results in shorter and longer fan operations. As in Fig. 4, too high and too low settings can be objectionable (see text).

of gravity operation. See Fig. 5. Now let us assume that in a given house the room which contains the room thermostat is affected to some extent by the slight amount of heat added to the room during the gravity operation of the plant. Let us also assume that you raise the bonnet switch setting much above a practical setting, over 200 deg. for example. In this case the forced-air plant may function primarily as a gravity warm-air system with only occasional fan operations.

QUESTION 30.—That does not sound like a desirable method of operation. What difficulties would be experienced in this case?

ANSWER 30.—In the first place if the system is designed to operate as a forced warm-air system, it should be made to function as one. In the second place the heat losses from the casing and ducts are increased. But the real

[Part 2]

Editorial Note: This article continues with the discussion of the Certified Quality Program for promoting high standards of equipment selection and installation which has been carried on by The Peoples Gas Light and Coke Company for the past year. It is divided into two parts: 1. A general discussion of the certification forms used in connection with the promotion of this program. 2. A reprint of the "Sample Heating Specifications for Furnishing and Installing Certified Quality Gas Fired Winter Air Conditioning Equipment in New Residences." This is reprinted with the permission of The Peoples Gas Light and Coke Company.

The remarks made in the first part of this article apply especially to the situation as it is believed to exist in Chicago.

Certified Quality-An Insurance Policy For Better Heating Equipment and Installation

A Program for Providing the Architect, Builder,
Contractor and Owner with a Measuring Stick
for the Selection and Installation of Central-
Fired, Gas Heating Equipment.

Sponsored by The Peoples Gas Light and Coke Company of Chicago

By B. A. Johnson

Sales Engineering Manager

IN the previous discussion (Jan., 1941) on Certified Quality—An Insurance Policy for Better Heating Equipment and Installation, we described briefly the program for providing the architect, builder, contractor and owner with a measuring stick for the selection and installation of central-fired, gas heating equipment. This article included a brief discussion on the reasons for the adoption of such a program and an outline of the principles of the equipment and installation standards together with a complete reprint of one important phase of the plan, namely the bulletin entitled "Information on Certified Quality Requirements for Gas Fired Winter Air Conditioning Equipment Installations."

In continuing with the description of various other details of this program, we are including in this brief discussion comments on the "Guarantee Certificates" that are made available to manufacturers and contractors in connection with their cooperation, together with a reprint of the "Sample Heating Specifications for Furnishing and Installing Certified Quality Gas Fired Winter Air Conditioning Equipment in New Residences," which is recommended for use by

architects, and the miscellaneous questions and answers relating to the administration of Certified Quality by The Peoples Gas Light and Coke Company.

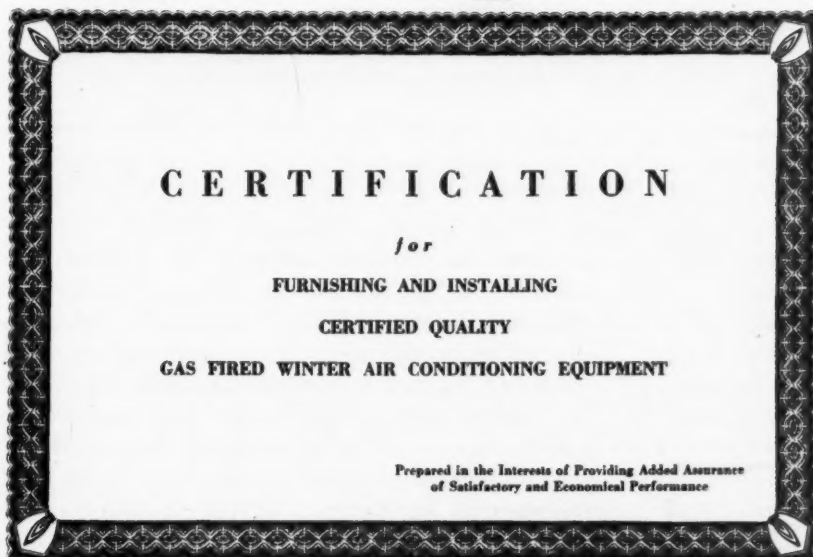
Guarantee Certificates (Equipment)

The first of these is a guarantee certificate on the equipment only. (See illustration No. 1.) It can only be offered by the manufacturer or demanded by the contractor. This form serves in a sense as a guarantee bond to the contractor that the manufacturer will furnish equipment that meets Certified Quality standards. As can be seen in the illustration, this certificate includes a general description of the equipment that is proposed and outlines specifically various details of the equipment which are considered essential to a proper description. There are also references to the fact that the equipment is properly sized and that it has been interpreted by The Peoples Gas Light and Coke Company as meeting Certified Quality standards.

This interpretation is significant because, before supplying the manufacturers with such forms and providing them with a letter stating

Illustration No. 1

Right—The Guarantee Certificate on equipment only is for use by the manufacturer. The manufacturer gives the certificate to the contractor as proof that the manufacturer's product meets the requirements of Certified Quality.



Prepared in the Interests of Providing Added Assurance
of Satisfactory and Economical Performance

Illustration No. 2

Left—The Installing Certificate is given the home owner by the contractor in proof that both the equipment proposed and the design and installation of the system meets Certified Quality provisions. It is a guarantee and protection for the owner.

that their equipment meets Certified Quality standards, the Gas Company requires the manufacturer to fill out questionnaires covering all details of his equipment. In addition to this, in most cases Laboratory tests are made and field inspections conducted so as to determine all facts needed to make such an interpretation. In other words, the use of this certificate means that not only does the manufacturer say that his equipment meets the standards but that it has also been so interpreted by the Gas Company and that this interpretation has been based on a very careful review of all the information available plus Laboratory and field data.

Guarantee Certificates (Installation)

The second certificate makes reference to both the furnishing and installing of the equipment and is available for use by installing contractors or builders who wish to assure their customers that the equipment they furnish and the installation they will make will be in conformity with the Certified Quality standards. (See illustration No. 2). This certificate is used by the Gas Company's own sales organization as a means of recommending to prospective users of gas heat what type of equipment to purchase and what type of installation to demand from the contractor. It is also made available to contractors so that they may specifically inform their

prospective customers of the type of equipment that they will use and the type of installation they will make and, through this form of guarantee, assure the customer that the equipment and installation will meet Certified Quality standards. Upon inspection of the illustration it can be noted that specific attention is given to the type of building, the type of construction, insulation and other factors that relate to the kind of lay-out for which the installation is intended. This, in itself, makes the certificate of particular value. In cases where customers ask our Company for recommendations on the type of equipment to use or the kind of installation to make, we give them one of these certificates rather than recommend any specific heating equipment or any specific heating contractor or builder.

Specification Form

Another part of the promotion of this program which should be interesting is the Sample Heating Specifications form. It can be used by architects in connection with their requests for bids on heating installations. This particular set of specifications is made up in brief but is set up in such a way that where specific requirements are not mentioned they are indirectly covered by reference to the term, "Certified Quality." However, it can be seen by reviewing the Sample

CERTIFICATION FOR FURNISHING AND INSTALLING CERTIFIED QUALITY GAS FIRED WINTER AIR CONDITIONING SYSTEMS

To:

The following pertinent information is submitted with our proposal to furnish and install gas fired winter air conditioning equipment for the building to be constructed at

plans figured with

wall construction and

wall insulation and

UNIT PROPOSED

Manufacturer

Series

Type or

Model

Nature of Guarantee

INSTALLATION PROPOSED

The installation proposed includes the delivery and installation complete of the unit and necessary controls; all duct work according to lay-out proposed; all electrical wiring, gas and water piping, and flue connections according to details of the proposal; and, upon completion, the cleaning of the inside of the unit and the making of all air delivery and temperature tests and adjustments to secure satisfactory distribution of air to all parts of the premises heated.

It is hereby certified that the heating unit specified in this proposal is designed to furnish all of the four recognized functions of winter air conditioning, namely, controlled heat, controlled air circulation, humidification and air filtering; has an input capacity of Btu. per hour which is 1 1/2 times (or more) the calculated Btu. loss per hour based on construction details of plans submitted and using heat leakage factors recognized by the American Society of Heating and Ventilating Engineers.

It is also certified that the unit specified will satisfactorily heat the building to a 70°F. inside temperature when the outside temperature is -10°F.; will deliver at least one (1) cu. ft. of air per minute for each 100 Btu. per hour input capacity; is approved as a central heating plant by the American Gas Association and also is approved by The Peoples Gas Light and Coke Company as having reasonably complied with their Certified Quality requirements for such equipment.

It is hereby certified that the conditioned air will be delivered to the various spaces to be heated and returned to the unit through a complete system of sheet metal ducts designed and installed according to such minimum standards now recognized by architects, contractors' associations and national organizations, such as the National

Warm Air Heating and Air Conditioning Association and the American Society of Heating and Ventilating Engineers.

It is also certified that the air distribution system, room thermostat, summer switch and other controls, flue connections, erection of the unit, electrical wiring, and gas and water piping will be installed in accordance with the lay-out proposed and reasonably comply with The Peoples Gas Light and Coke Company Certified Quality requirements for such installations; and that the entire installation will conform to local building and air conditioning codes and local fire department regulations, as well as the regulations of other bureaus or bodies having jurisdiction.

Signed

Title

Company

Address

Date

The text of the Installing Certificate covers the building construction, the layout proposed, type of equipment and specifies briefly what the installation shall consist of. This certificate is signed by the contractor and given to the owner, builder or architect.

Heating Specifications, as published herein, that certain major points are distinctly covered.

Questions and Answers

Other items of interest in connection with this program can be described by answers to certain

questions that might arise after reading the above article and the one printed previously.

If a customer purchases Certified Quality heating, can he be assured of a lower operating cost?

Answer: It is not believed likely that a Certified Quality heating installation will create any exceptional reduction in operating costs. However, a Certified Quality heating installation will give definite assurance that the operating cost will be as low as the average of the best installations made.

Who has Certified Quality equipment?

Answer: Any manufacturer who reasonably complies with the various factors listed in "Information on Certified Quality Requirements for Gas Fired Winter Air Conditioning Equipment Installations," which has to do with the selection of the equipment, can be assumed to have Certified Quality equipment.

Who makes Certified Quality installations?

Answer: Any contractor who agrees to sell Certified Quality equipment and to reasonably comply with the installation considerations covered in "Information on Certified Quality Requirements for Gas Fired Winter Air Conditioning Equipment Installations" can be considered as providing a Certified Quality installation.

Will the Peoples Gas Light and Coke Company check the completed installation to see if it meets Certified Quality standards?

Answer: Yes. Field engineers make an inspection of each installation, and in addition to determining necessary information which makes it possible to approve or disapprove of it as a satisfactory gas heating installation, will also obtain the facts which will enable the Company to interpret whether or not such an installation can be classified as meeting Certified Quality standards.

Will The Peoples Gas Light and Coke Company publish a list of Certified Quality equipment?

Answer: No. Anyone who asks about specific

CERTIFICATION FOR FURNISHING CERTIFIED QUALITY GAS FIRED WINTER AIR CONDITIONING EQUIPMENT

To:

The following pertinent information is submitted with our proposal to furnish gas fired winter air conditioning equipment.

UNIT PROPOSED

Type or Model Btu. per hour input rating as approved by the American Gas Association

Series Air delivery capacity in CFM against 0.2" static resistance at the outlet

Make

Type

Main control valve

Room thermostat

Limit control

Blower control

Humidifier

Humidity control

Filter

Safety pilot

Gas pressure regulator

Motor

H.P. Rating

Overall Dimensions: Width Depth Height

Casing: Finish Color

It is hereby certified that the unit specified in this proposal is designed to furnish all of the four recognized functions of winter air conditioning, namely, controlled heat, controlled air circulation, humidification, and air filtering; has a capacity to heat a building of not more than Btu. heat loss per hour based on heat leakage factors recognized by the American Society of Heating and Ventilating Engineers, which heat loss is not more than 3/4 of the input rating of the unit in Btu. per hour; and will heat such a building to a 70°F. inside temperature when the outside temperature is -10°F.

It is also certified that the unit specified will be shipped with the controls and accessories as described in this proposal, and is approved as a central heating plant by the American Gas Association and also is approved by The Peoples Gas Light and Coke Company as having reasonably complied with its Certified Quality requirements for such equipment.

Signed

Title

Company

Address

Date

The Guarantee Certificate (for manufacturer to give contractor) lists all equipment furnished to meet CQ requirements and is a guarantee that the unit and accessories have met the tests and requirements of CQ.

equipment will be referred to the manufacturer in question.

How does The Peoples Gas Light and Coke Company enforce this Certified Quality program?

Answer: It is important to bear in mind that The Peoples Gas Light and Coke Company does not enter into any dictatorial attitude nor does it propose to act in any way as a police power in the enforcement of these standards. Our purpose is primarily to put into the hands of the manufacturer, architect, builder, contractor and customer the essential information which makes it possible for them to sell or buy in terms of Certified Quality.

Aim of CQ—A Satisfied Customer

I believe it is important here to clarify the fundamental of Certified Quality and wish to emphasize therefore that, in my opinion, it is not embodied alone in a set of technical standards. It is the development of ways and means for protecting customer satisfaction which, in turn, establishes sound protection to the existing and future market for gas heat. This is accomplished through the promotion of activities that will create a desire on the part of the consumer to buy in terms of high standards of quality instead of price. It is accomplished when architects, manufacturers, contractors and other selling agencies sell and install only that type of heating equipment which, through such features as serv-

iceability, long life, fool-proof operation, high efficiency and proper application and installation, will give the customer assurance of complete heating satisfaction.

For instance, Certified Quality in Chicago means the above fundamental applied to winter air conditioning and our efforts in this direction have been to create incentives to contractors to sell high quality winter air conditioning equipment and make high quality winter air conditioning installations because this type of business represents the largest percentage of the total gas heating business being sold and because it is in this market that the greatest problem exists.

For instance, on the west coast, the problem of Certified Quality may have nothing to do with winter air conditioning, but may be one of promoting better floor furnace installation practice or be the promotion of the desire on the part of the customer and selling agency to use other types than floor furnaces for certain types of heating installations. The promotion of Certified Quality in other localities may mean creating an incentive on the part of the customer and selling agency to prefer vented appliances over unvented appliances and, again, to sell central heating plants instead of space heating appliances.

In all of these instances, the fundamental again is to promote better customer satisfaction through better equipment and better installation methods.

Sample Heating Specifications For Furnishing and Installing Certified Quality, Gas-Fired, Winter Air Conditioning Equipment in New Residences

Heating Specifications

of the labor and material to be furnished in the installation of a **CERTIFIED QUALITY** gas fired winter air conditioning system in the residence to be erected on the Northeast corner of Michigan and Adams Streets, Chicago, Illinois.

Mr. and Mrs. John Doe,
Owners.

John Smith, Architect
Chicago, Illinois.

The work required to be done in these specifications includes:

Furnishing all labor, materials, equipment and services necessary for, and reasonably incidental to the proper completion of a Certified Quality gas-fired, winter air conditioning system. All work, materials and equipment to be furnished by this contractor, excepting that specified as being done by others.

Furnish a written guarantee that this gas-fired, winter air conditioning system will heat all the rooms, at one and the same time, to a temperature of seventy degrees (70°) F. when the outside temperature is minus ten degrees (-10°) F.

This contractor shall guarantee to replace, without charge to the owner, any part of the heating system

which shall become defective within one year from date of acceptance, due to faulty material, design or workmanship.

Winter Air Conditioning Unit

The heating unit selected must be approved as a central heating plant by the A.G.A. and also must meet the Certified Quality requirements as published by The Peoples Gas Light and Coke Company.

Furnish and erect a Certified Quality gas-fired, winter air conditioning unit of sufficient capacity to satisfactorily heat the building to 70° F. inside when the outside temperature is -10° F., and which will deliver at least 1 cu. ft. of air per minute for each 100 Btu. per hour input capacity, complete with: gas burners, gas cocks, gas pressure regulator, safety pilot, automatic gas valves, main shut-off valve, limit control, automatic blower

switch, centrifugal blower, capacitor type motor, air filters, humidifier and draft diverter.

Installation of Unit

Erect the unit in accordance with the recommendations of the manufacturer. Provide an air tight metal base plate under all parts of the unit, or in some manner caulk or seal the base to prevent basement air from being drawn into the system.

Air Distribution System

The air distribution system must also conform to the Certified Quality requirements of The Peoples Gas Light and Coke Company.

Duct Work

The conditioned air shall be delivered to the various spaces to be heated and returned to the unit through a complete system of sheet metal ducts.

All ducts, branches, risers and stacks shall be constructed of prime galvanized iron sheets with full free area maintained without abrupt angles or obstructions. Plenum chamber and trunk lines shall be constructed with double locked seams and connected at joints with standard "S" and drive slip joints, or equivalent method. Risers to be No. 26 gauge and horizontal ducts up to eighteen inches (18") to be No. 26 gauge while those over eighteen inches (18") wide to be No. 24 gauge.

All connections between main trunk, branches and risers shall be made with approved transition fittings with equal cross-sectional area throughout. Fittings taken off main trunk to be full depth of trunk.

No individual supply duct shall be designed to handle more than 150 C.F.M.

No individual return duct shall be designed to handle more than 200 C.F.M. Return air ducts shall be constructed so that there are no traps.

Full support of all risers and fittings and basement duct work shall be made to studding or joists with heavy galvanized band iron, or equivalent. Main trunk lines thirty inches (30") or over in width shall be supported every four feet (4') with not less than one-half inch ($\frac{1}{2}$ ") standing seams.

Volume dampers with positive locking devices shall be installed in each supply and return branch duct. Such dampers shall be accessible, operate freely and be provided with an indicator to show its position in the duct. Stack-head dampers will be considered as the equivalent of a volume damper. If splitter dampers are used, the length of these dampers shall be at least twice the width of the branch duct.

All supply and return ducts shall be provided with a label located for convenient observation (preferably at the damper). This label shall designate the space supplied, C.F.M. supplied, and the proper position of the damper when the system is balanced.

All supply and return risers and branch trunk ducts run

in outside walls and unheated spaces to be insulated with one inch (1") of Balsam Wool or equivalent, securely fastened in an approved manner.

Registers and Grilles

Registers shall be of the diffuser type specifically designed for air conditioning systems, shall be at least the full width of the riser and shall have a free area of not less than 75% of the total face area. All registers shall have provision for closing which is readily accessible from the room in which the register is located. Wall register faces to be assembled against felt gaskets to prevent streaking. Wall registers shall be supplied with frames securely fastened to studding and tightly assembled to the stack-head to preclude air leakage.

Return air grilles to be installed not more than one inch (1") above the floor. Return air grilles in bedrooms and the basement recreation room shall be provided with grilles having shut-off dampers operated from the face.

Electrical Work

All electrical work shall be done in accordance with the requirements of local ordinances, codes and rules and regulations of the National Board of Fire Underwriters. The 110 volt line supply to the unit shall be separate circuit and a separately fused switch provided. Make all electrical control and fan connections in accordance with the recommendations of the manufacturer of the heating unit.

A low voltage heat actuated type room thermostat shall be installed not more than five feet (5') above the floor as shown on plan. A summer switch shall be provided at the head of the basement stairs which makes it possible to operate the blower independently of all other controls.

Flue Connections

The draft diverter shall be connected directly to the furnace outlet in accordance with the manufacturer's design and as approved by the American Gas Association. A furnace flue made of not less than No. 26 gauge Armco, Toncan, Lyonore or equal corrosion resistance material shall be connected as short and direct, but with some upward pitch, to the chimney. Install a clean-out below the flue entrance to the chimney.

Gas and Water Piping

Gas and water piping will be brought to the unit by others. This contractor is to make the final water and gas connections, and is to make all electrical control and fan connections.

Balancing System

Make all air delivery and temperature tests and set all dampers and louvers to secure satisfactory distribution of air to all parts of the premises heated.

Have You Received Your "Yardstick"?

(Continued from page 41)

ing it, will go a specification form which gives everyone concerned an exact picture of what is proposed and how it shall be installed.

Every installer of furnaces should have copies of the "Yardstick" and specification. It is not intended that these shall be passed out promiscuously or needlessly; rather, they should be used to show what you intend to supply, to compare your proposal with competitors, to satisfy the suspicious buyer.

Above all, it is hoped that wide use of the "Yardstick" will elevate the general standard of work going in.

Get your copies of the "Yardstick" from the manufacturer of the furnace you handle. If your furnace manufacturer is not a member or does not have copies, write to the association at 145 Public Square, Cleveland, Ohio. The association will tell you how much copies cost in the quantities you wish to buy.

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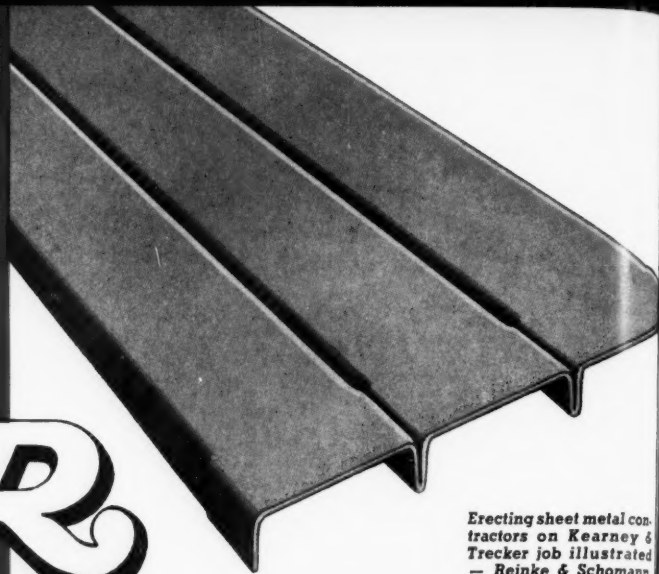


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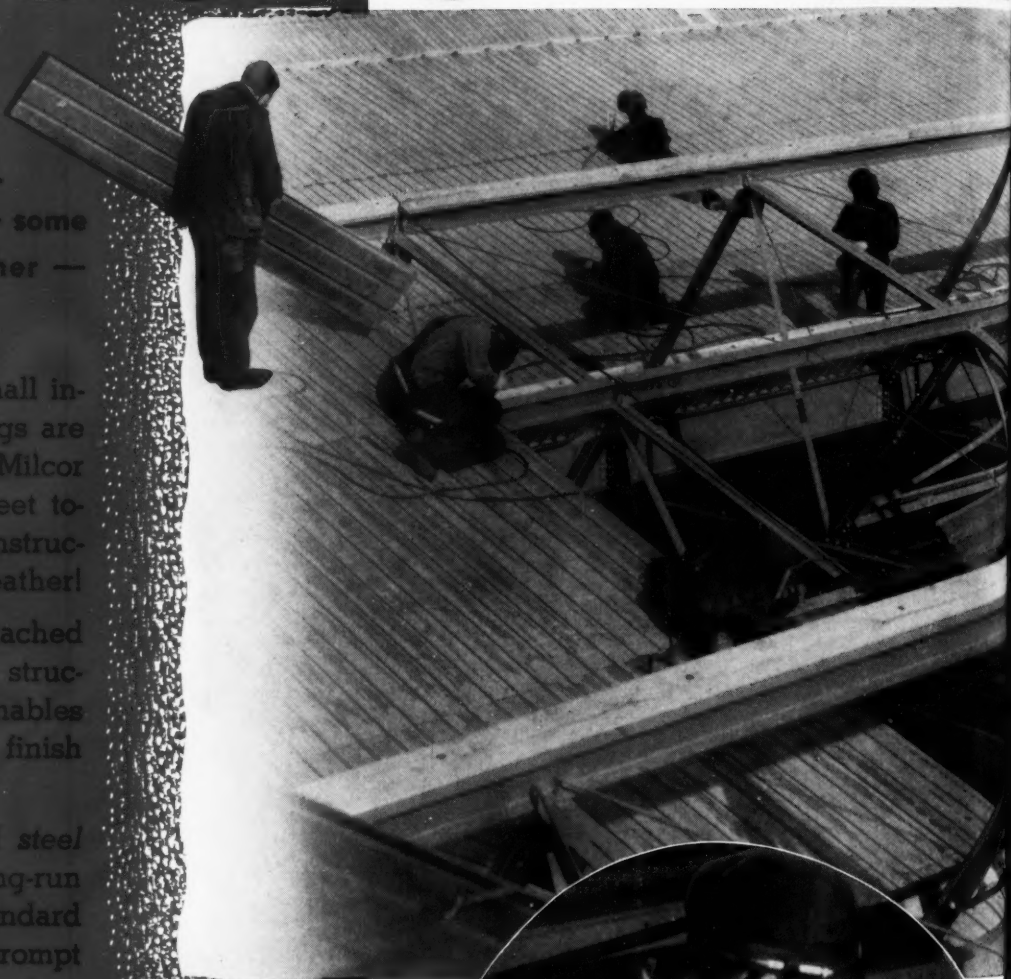
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Milcor Deck is installed directly over super-structure. Clips — designed for speedy placement — lock plates to one another and secure insulation to roof deck.



View of the General Laboratory showing multi-cabinet enclosures. By exhausting only from the enclosures, air is not disturbed out in the room and heat removal is minimized.

Fume Removal System to Handle 1,500 Gases

By R. C. Nason

A RECENT example of interesting chemical laboratory ventilation is that involving fume exhaust in four rooms of Cooper Institute, New York City. The installation, handled by Airite Ventilating Co., New York, included lead coated sheet steel ducts, four fans and separate systems for 22 hoods wherein may be released some 1,500 different gasses.

This type of school chemical exhaust presents a problem different from that encountered in industrial buildings because in manufacturing it is customary to design a system satisfactory for a single gas or a small number of gasses whose characteristics are known and constant. In contrast, school laboratory layouts must frequently consider more than 1,000 different gasses, some heavier, others lighter than air. It is estimated that the exhaust work installed by the Airite company at Cooper Institute handled more than this number.

In manufacturing, the one or few gases usually require one certain metal for ducts selected as suited to handling definite fumes. In contrast, the selection of one duct material for school laboratory plants must be a compromise, and George Hilmer, who designed the Cooper work, selected lead coated steel in 20, 22 and 24 gauge as being the best all-around material available.

The two classrooms with the largest number of hoods have six and eight hoods each. E. H. Sheldon & Co., Muskegon, Mich., furnished their

standard Transite units each 6-ft. wide. Some hoods have slide windows, others are open-front. The widely different gasses involved made it advisable to furnish three full-width slots per hood.

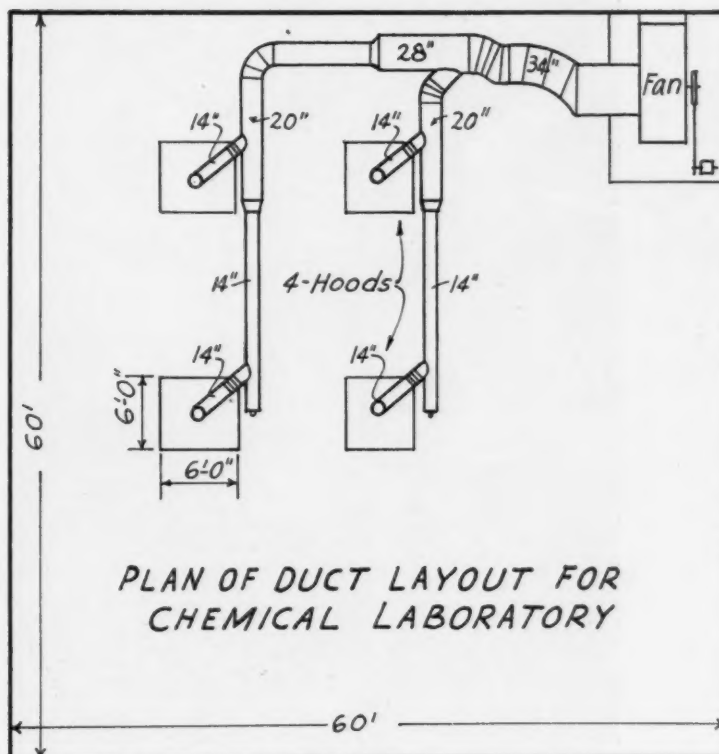
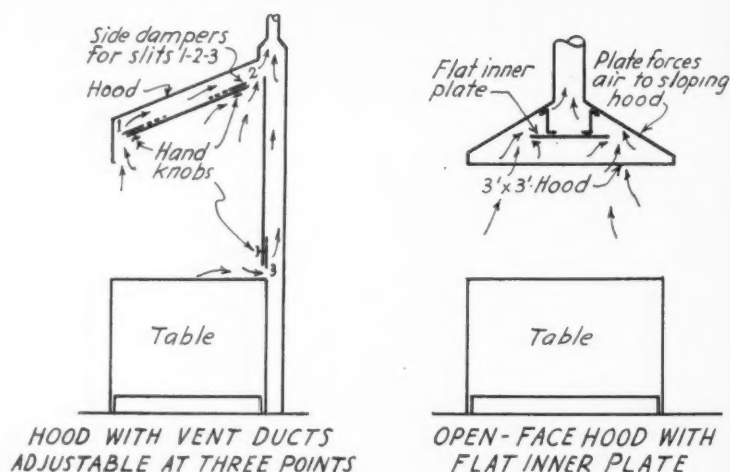


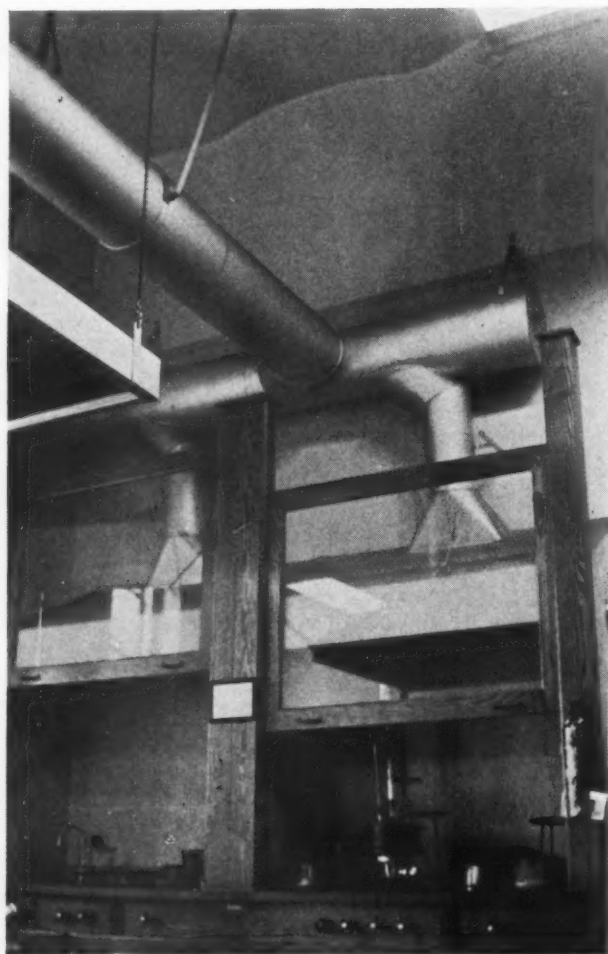
Fig. 1—Plan of General Laboratory showing the four enclosures (see photo above) and exhaust piping back to the fan.



Above—Fig. 3—Arrangement of hoods, plates and slots for cabinet and open table. Arrows indicate air adjustment possibilities.

Right—Photograph of General Laboratory piping at the fan. Compare with Fig. 1. Note pipe increases at branch connections.

See Fig. 3. Slot dampers, hand adjustable, are located in three places. First, at the front edge of the sloping ceiling, second, at the back edge of the ceiling and, third, at the base of the back



Cabinet enclosed tables have individual hoods which exhaust through controllable slots as shown in Fig. 3. Note first section transition which minimizes condensation.

piece level with the table. The areas between inner and outer ceilings act as plenums. The same is true of the back side, which in this instance is against the wall. To explain, there is a plenum between inner and outer backs, the top of the area opening into the general plenum near the outlet.

The Airite Ventilating Co.'s first step was to connect 6-in. diameter round risers to rectangular to round throat fittings on hood outlets. Graduation of the main duct was carried through precisely—main sizes ranging from 6½ in. to 16-in. in the six-unit layout and from 6½ in. to 18½ in. in the 8-unit system. This provides uniform air flow through all hoods.

Heat Removal Should Be Minimized

The designer, Mr. Hilmer, believes that several general conclusions can be drawn from the results. One is that although 3,000 ft. per min. velocity, to give 2 in. suction pressure, is the rule, most any positive air movement at the exhaust slots removes average fumes. Second, that it is better to provide high velocity than large volume of air in motion due to the danger of excessive heat withdrawal from rooms.

He further suggests that when necessary, excessive heat withdrawal can be corrected by introducing a supplementary air supply near the front edges of hoods. This relieves the objection to taking out too much room-air, or what may be called heat-robbing. In the case of school

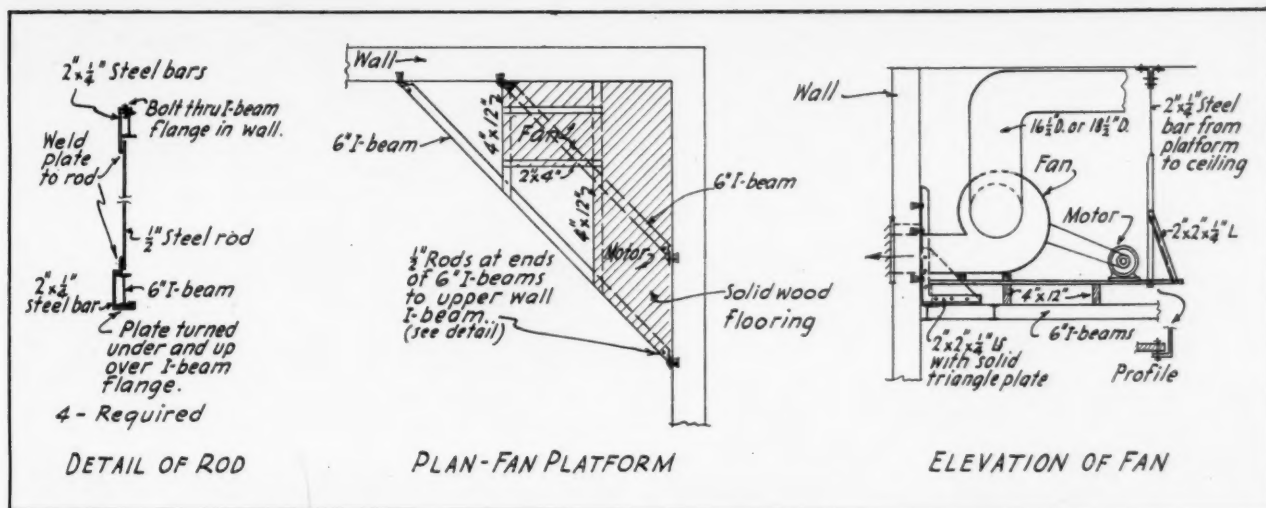


Fig. 2—Details of fan support. Planking, on 2 by 4's, on 4 by 12's, on steel I-beams—all supported from above and secured to the walls—make a rigid support.

laboratories, however, students usually remain in labs only a short time hence do not usually object to heat loss from such rooms.

Final fume exhaust in the Cooper Institute system occurs through louvered outlets wherein louvers also are lead coated. Fig. 2. One trouble cropped up, however, and that had to do with the rusting of stock-type steel louver springs. The result was failure of louvers to open and close as required. A solution was the substitution of stainless steel springs.

Another trouble point was the tendency of vaporous gasses to deposit moisture in the first pipe section off the hood connecting the rectangular-to-round transition to the branch. The original design was in compliance with state factory inspection department rules. The difficulty was overcome by substituting smooth, seamless connections here that allow no moisture pools to form.

Another pointer offered by the Airite Ventilating Co. includes the desirability of placing a good

tight handhole with a slide door in sheet metal collar near the fan inlet. This permits louver spring changes, repainting of fan and housing with black asphaltum, as was done to duct interiors throughout in the Cooper work.

Duct exterior surfaces were aluminum painted, this to comply with a building management request. A building service employee revealed that this type of paint has proved especially good in protecting laboratory equipment.

In the research laboratory there are two slide-window, wall-backed hoods of much the same general type used in class rooms but there is also an open hood over a central table. Fig. 3. The table hood, 3 ft. per side and square, looks much like a restaurant cooking range hood. Its design is simple.

One special feature, however, is the use of a 16-in. square, flat plate about 8-in. below the outlet. This creates air velocity along the sloping ceiling sheets of the hood, thus providing the positive suction necessary. The suspended platform provided for fan and motor support here also is deserving of special notice because of its rigidity. Fig. 2.

Concentrating the Exhaust

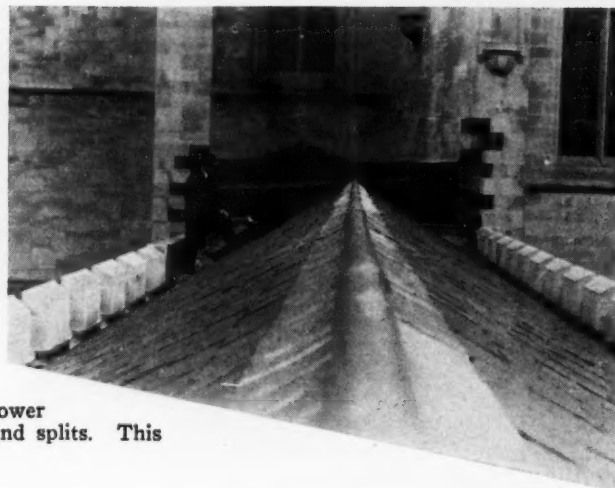
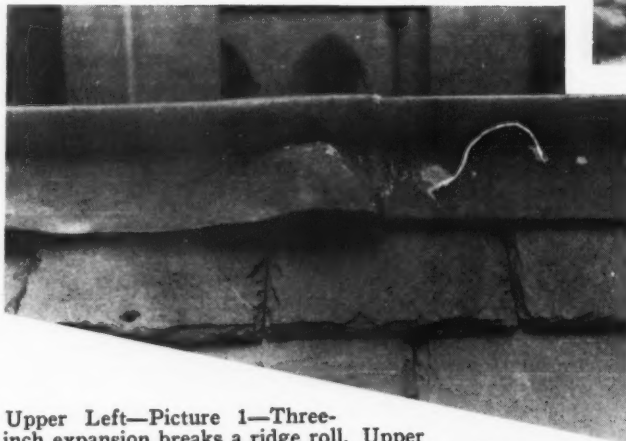
The large, general laboratory is 60 ft. by 60 ft. with a 17 ft. ceiling and has about 61,000 cu ft. contents. To change the entire room contents every 3 min. would result in undue heat withdrawal. So, vital spots alone were treated.

The sheet metal contractor first asked the school authorities to provide four 6-ft. by 6 ft. slide-window cabinets; each space having openings at which students worked. See photo. In the flat false ceiling of each such cabinet was cut a 12 in. by 12 in. opening. The area between inner and outer ceilings thus serves as a plenum. The plenum was connected to 14-in. diam. risers as one photo and Fig. 1 show.

The mains were sized for constant velocity which increased the duct size to 34 in. at the fan
(Continued on page 112)



Exhaust line serving a row of cabinet tables. Note progressive increase in pipe size as branches join the main. Velocity is thereby maintained constant throughout.



Upper Left—Picture 1—Three-inch expansion breaks a ridge roll. Upper Right—Picture 2—Badly split seams where ridge roll joins gable cap. Lower Left—Picture 3—Badly bulged ridge roll caused by expansion which did not contract. Lower Right—Picture 4—Long view of ridge roll showing buckles and splits. This was replaced with lead coated copper.

Temperature, Rain, Snow—*Weather's Blitzkrieg*

By Lawrence E. Gichner
Gichner, Inc., Washington, D. C.

CRACK! Crash! Bang! Bombs dropped from airplanes may twist men and mortar into worthless wreckage.

But equally destructive are the winds, the rain and snow, though they work slower.

Men dream of building edifices for the ages. But these three super dreadnaughts of destruction battle obstinately and rule otherwise. Man has many lessons yet to learn before a lasting triumph can be won over nature's blasting elements.

Religious folk raised a mighty structure to their God. High upon Mount Alto, ever silhouetted against the horizon of Washington's skyline, the Protestant Episcopal Cathedral overlooks the Nation's Capitol. Here daily, hundreds of admiring visitors gaze up at flying buttresses, decorated columns, carved arches and majestic stained glass windows. Here with bowed head they pay tribute at the crypt of Woodrow Wilson and the Hero of Manila, Admiral Dewey.

Those who labored to erect this noble architectural prayer, envisioned their efforts perpetuated for the centuries. Yet ugly, brown, damp, discoloring stains upon the ceiling cause one to pause and doubt. Drippage of annoying rain water drives one to wonder and investigate.

What will happen to this roof twenty-five, fifty, a hundred years from now when leaks already appear only ten years after its application? Is it fact or fiction that the covering on Europe's far-famed Cathedrals have survived the bludgeons of centuries? Does our American climate present severer conditions? Are our materials different? Are our methods of application incorrect? Just where does the trouble lie?

Frankly, lead is not the proper medium for the Washington climate. How it holds up in other parts of our country and different sections of the world I do not know. But as far as Washington is concerned, it leaves much to be desired.

Here we have stifling summers and cold win-

ters. Frequently, in the afternoon of a sweltering hot day a sudden thunder shower will quickly darken the sky and pour down a veritable Niagara that floods the streets and overflows the sewer system. Huge, damaging hail stones are not infrequent in summer. A big drop in temperature follows.

What this drop does to metal, those familiar with expansion and contraction readily know. It strains the ductility of the material to its fullest. Where the metal won't give it is cracked and it is torn.

The roofs on the Cathedral are heavy lead, laid on batten construction. Highest roofs of severest pitch, on the peak, have given little worry since certain areas were replaced. Certain parts of the original roof slipped under its own weight and were replaced with somewhat lighter material.

"How much pitch should a slate roof have?"—is a frequent question: to which the best reply I know is an old adage that advises "steep enough so you can't walk or stand on it." This rule also holds good for lead; for it is on the lower, comparatively flat decks of the Cathedral that trouble has arisen—decks on which you can readily walk.

Efforts at soldering open seams proved futile. The lead is dead, lifeless, and quickly melts away from the hot soldering copper. That it should be-

come inert in so short a time does not fore-tell good.

We found that one of the biggest disadvantages of the lead is the fact that it contracts and leaves seams open for water passage. That it expands and slides, sags and splits, opening more passages for water.

Ridge and Batten Failures

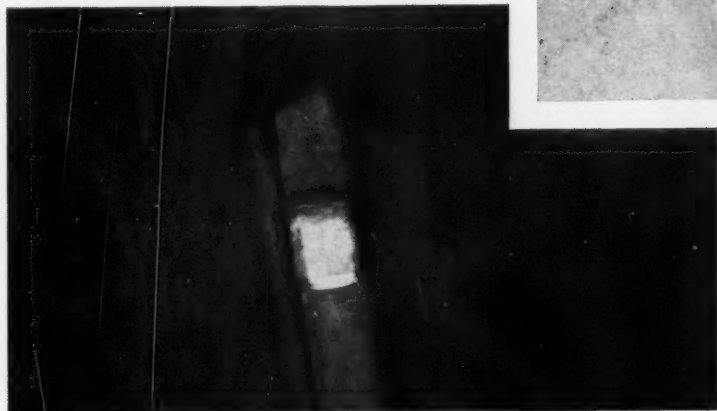
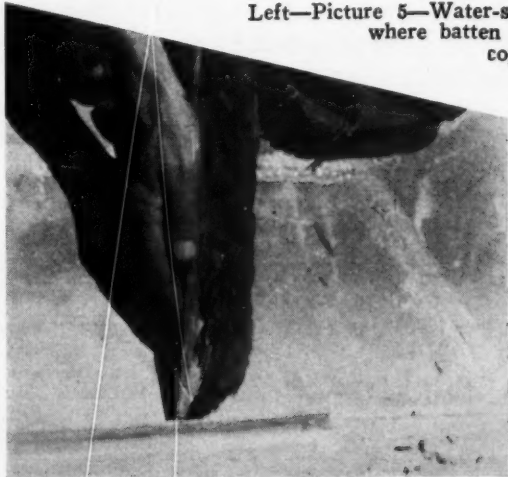
An extreme, yet illustrative point regarding this contraction and expansion is well illustrated on a section of ridge roll that separated a distance of three inches in one spot and bulged to shapelessness in another. (See pictures 1 and 3.)

The metal pulled apart in the seams of the batten pans and also the seams of the batten caps. Water worked its way underneath. (See pictures 6, 7, 8.) As one walked over the lead on cold days there was the sound of ice and frost beneath the metal crunching under one's feet.

We raised areas at the bottom slope of the batten roof and found the cement composition soaked and crumbly and the battens almost rotted away. (See picture 5.) Continuation of this process of the moisture freezing will be destructive to all the underlying structure. (See picture 17.)

The permanent solution to the situation seemed to be a properly installed copper or lead coated copper roof, but in the light of a modest appro-

Left—Picture 5—Water-soaked and corroded batten. Upper Left—Picture 6—Opening at seam where batten cap had sagged down. Lower Left—Picture 7—Three-inch lead coated copper cleat inserted in open batten seam to seal joint. Lower Right—Picture 8—Notched corner of batten cap exposed through contraction and sagging, opening cap to water penetration.





priation for repairs we did all we possibly could to make our efforts effectively lasting.

At the worst areas, particularly around the base of flying buttresses, we removed and did install leaded copper. (See pictures 10 and 12.) We used flat seam construction in new gutters with ample and strategic use of type "K" expansion seams. (See pictures 15, 16, 17, 18.)

The type "K" expansion seam was perfected by Joshua R. Kelley, for many years supervisor of sheet metal and roofing construction for the Architect of the Capitol. The seam is very similar to a standing lock seam, but with the seam soldered instead of open. (See picture 16.)

Where battens impeded the ready flow of water, the trouble was partially eliminated by shortening and cutting back the battens. (See pictures 15 and 18.) The battens were found to be well soaked. Some were completely rotted. Nails were badly rusted. (See picture 5.)

This new pan structure around the buttresses will prove an effective method of shedding the water. It will aid in eliminating the water problem when ice packs around the buttress bases in winter. Before the battens were shortened as shown, in winter weather the water would freeze on the edges and then back up and come in at the seams.

Batten Caps Opened at Seams

The regular method for installing batten caps is to notch them at the seam to permit lapping. However, when the metal expanded and slipped, the corners of the notched areas were exposed and allowed rain to enter. (See pictures 6, 7, 8.)

Opening the caps and replacing them after repairs quickly proved futile because the brittle lead split when re-bent at the seam.

We, therefore, devised a lead coated copper cleat 3 inches long and as wide as the batten that capped the open seam and made the section water tight.

Where lead had been placed on vertical surfaces, it frequently sagged and buckled under its

From Top to Bottom—Picture 9—Pencil standing in hole in gutter and finger points to open seam. Picture 10—Vertical lead sagging from own weight. Picture 11—Discoloration traces water flow from behind vertical flashing and into gutter seam. Picture 12—Water which entered behind vertical flashing on buttress came out at flashing base or entered the building. Picture 13—Too small gutter held snow and rain permitting water to back up under slate and enter roof. Picture 14—Buttress base flashing open where flashing joins open gutter in slate roof.

own weight. (Picture 10.) These spots were also removed and resurfaced with copper.

Soldering the new copper to the old lead proved practically impossible, because as previously stated, the old material melted right away from the soldering coppers. Therefore, between the two, and to each, we soldered a 4 inch strip of new lead. (See pictures 16 and 18.)

V-Groove Reglet Insert

Where the metal of various surfaces joined the masonry, instead of bending the metal into the stonework and reglet it was bent a half inch away to form one side of a "V" groove. This groove was filled with a high grade caulking compound. The purpose of flanging the metal out was to give a greater adhering surface for the bonding compound.

The ridges on slate roofs were replaced also with lead coated copper fastened with brass screws and washers. The holes for the screws were made many times larger than the screw itself. This gave the ridge roll ample opportunity for movement. The screw, washer, and hole were made water tight by a metal cup cover that was soldered over them.

Seams that could not be soldered were cleaned, caulked, and malleted flat.

Too Small Gutters Do Not Drain

Certain gutters built between a parapet wall and slate roof were designed too small and too narrow so that melting snow backed up under the slate and penetrated to the interior. Access to repair was particularly difficult. Mechanics had to work in terribly cramped positions. (See Picture No. 13.)

Walls inside have been frightfully discolored by penetrating water. This water entered both through the inside of parapet wall and also during winter by backing up under the slate.

From Top to Bottom—Picture 15—New Type "K" expansion joints at juncture of valley slopes and ridges. Picture 16—Type "K" expansion joint is an open base standing seam, soldered. Picture 17—Type "K" expansion joint in new lead coated copper valley. Picture 18—Expansion joint in new valley. Note new 4-inch strip of lead to join new copper to old lead because old lead could not be soldered to the copper. Note, also, batten cut back to raise batten end farther out of gutter. Picture 19—When lead was opened, the base was found crumbly from water penetration and frost.





Monel Working Surfaces

ALAMO SHEET METAL AND ROOFING COMPANY, San Antonio, Texas, has for some years built cabinets, sinks, work tables, drain boards to special order for commercial and residential customers employing fabricating and design ideas which the company has developed to insure working surfaces which are solid, sound-proof and formed with a minimum of welded or soldered seams.

These construction ideas are shown in the photographs of a recently completed installation in a large San Antonio residence. The layout covers more than half the wall length of the kitchen and pantry as shown in the plan. Included in the contract were a single and double sink with long adjoining working surfaces, a special table, a bottle cooler and two drinking fountain trays.

In this installation Alamo did not furnish the cabinets—they covered the work surfaces and also furnished a special inner container for the bottle cooler.

The covering material used throughout is 18-gauge Monel in satin finish, the installation requiring some 750 pounds of sheets. The sink bowls were purchased separately, in satin finish, and were welded to the working surfaces with invisible seams. To obtain this seam the drainboard edge was carried over the top of the lip of the bowl as in a lap weld. Then welding rod was deposited along the edge. The sheet, deposited metal and bowl lip were then ground down and polished to get the invisible seam.

A detail in the plan shows the unit construction of working surface, back-splasher and front rim. The photographs show this construction which eliminates any seam along the base of the splashers. The front edge is turned down and

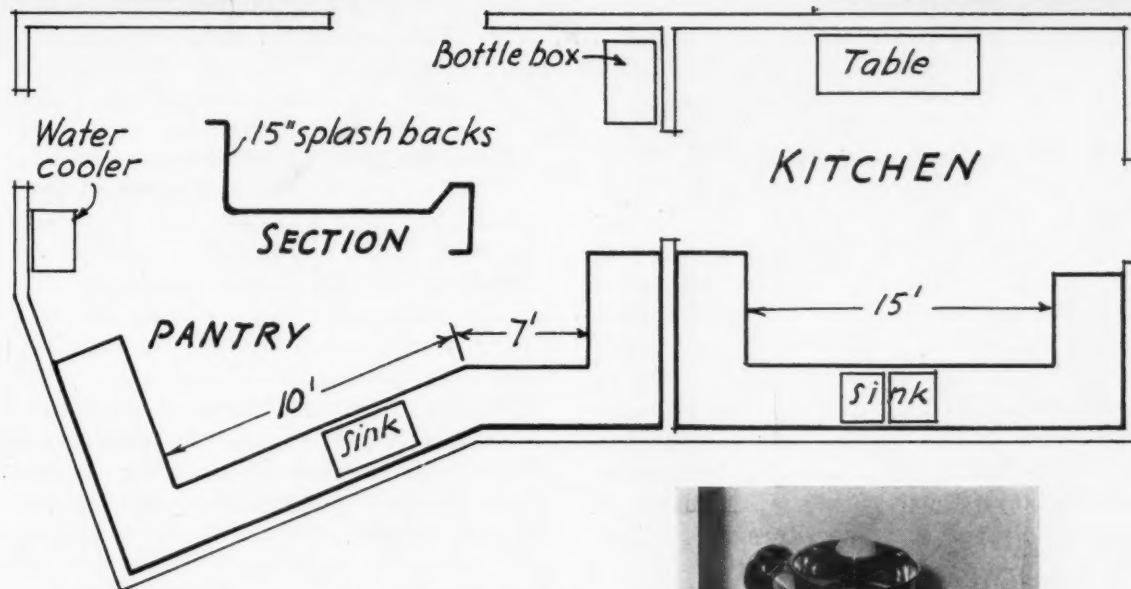
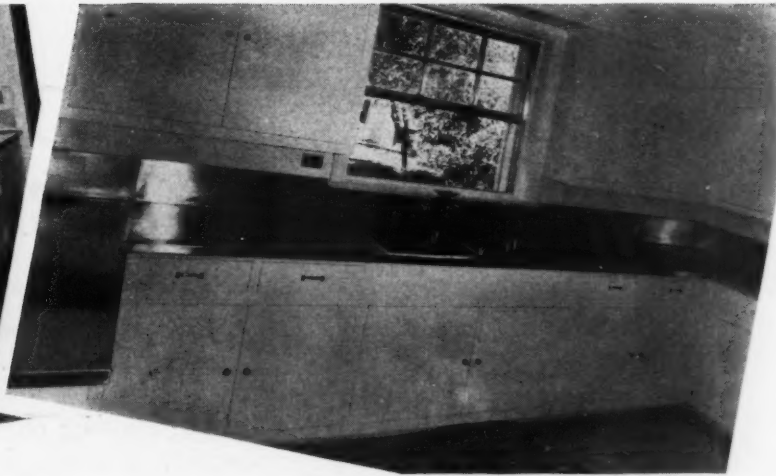
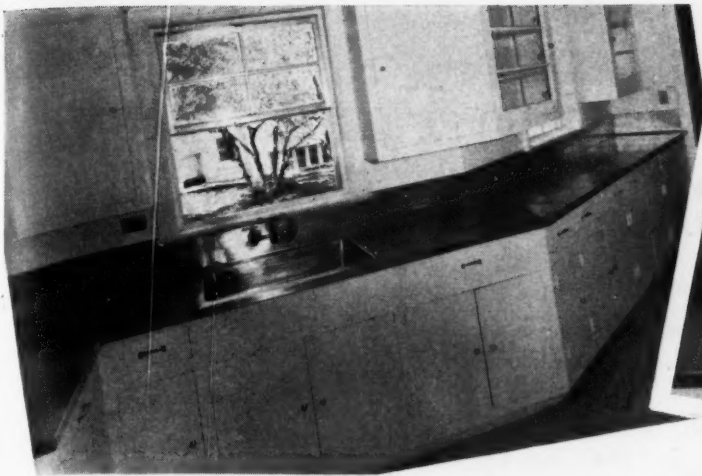
under, as shown, to form a seamless and smooth nose and end to the surface. The surface edges are so formed—again without any seaming—that a wide rim is provided on all drainboards. This construction made seams necessary only at rim miters, and at the meeting line of working surfaces extending in different directions. The photographs show these seams clearly.

The sections of the working surfaces were made complete in the shop ready for placement on the cabinets. This was done in order that all seams could be shop welded and most of the finishing and polishing completed in the shop leaving only touch-up polishing for the field.

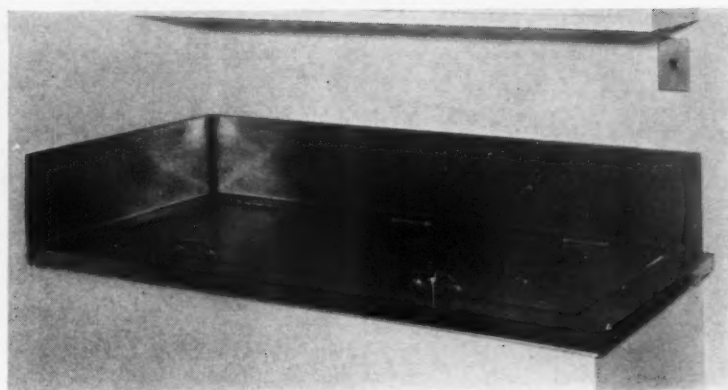
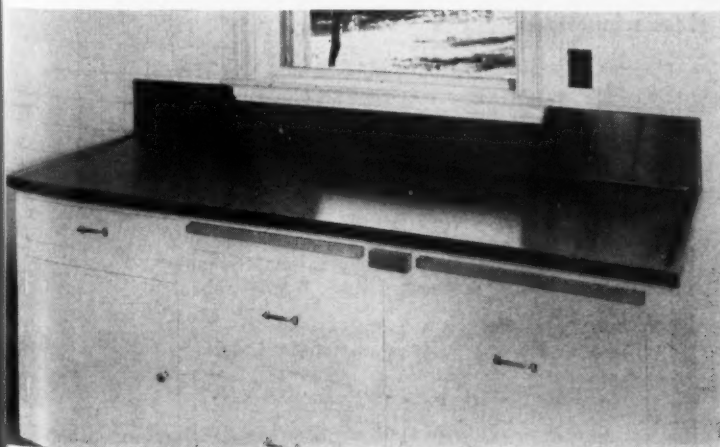
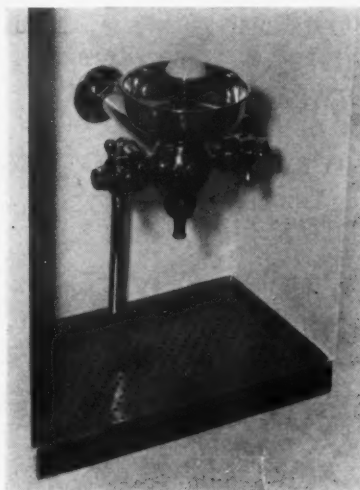
The working surfaces are assembled on structural framework and the framework was protected by moisture proof paint. In order to obtain a solid surface, all Monel flat surfaces are backed up by a 14-gauge steel plate to which the Monel is spot soldered at close intervals to hold the two sheets together. After the Monel and plate were "tacked" together the under side of the 14-gauge plate was sound deadened by application of the heavy asphaltum deadener.

The bottle box shown in one photograph is a double walled unit using 18-gauge Monel for both inside and outside shell. In between is packed 4 inches of insulation. The cover, as shown, is also double and insulated with the two shells separated by structural framing. The rim and back splasher, like the drainboards, are formed integral requiring a seam only at the upright corner.

The trays for the two drinking fountains were perforated in the shop and formed with hemmed edges. The tray fits into a fairly deep rim of Monel and the rim, in turn, is seamed to a shallow sink and drain pipe stub which connects with a plumbing drain.



The diagram above shows the floor plan of the kitchen and pantry while the photographs show the various units covered with Monel by Alamo Sheet Metal Co. All surfaces are formed over a 14-gauge steel plate for stiffening and the plate is sound deadened by plastic. Note the few seams and the special rim and back splasher. The bottle cooler (lower right) is a double shell with insulated walls and cover. Sink bowls were purchased and welded to the working surface in a lap weld which was ground and polished.



Vocational Schools Offering Pre-Employment Courses for Sheet Metal Trades

By L. S. Hawkins

Chief, Trade and Industrial Education Service
Federal Security Agency, U. S. Office of Education

In the article by Mr. Hawkins on "Refresher" and "Supplementary" vocational training in the November issue (page 112) the statement was made—"The first \$50,000,000 appropriation was made . . ." etc. The sum should have been \$15,000,000, not fifty million.

APPROXIMATELY 80 vocational schools in 25 States operating under the Smith-Hughes and George-Deen Acts are currently offering courses in the sheet metal trades. These schools generally meet the requirements for successful pre-employment trade training. Wherever sheet metal is taught, the schools have equipment which is comparable to that in industry. Pre-employment training offered by these schools is sometimes referred to as pre-apprentice training. Where representative trade advisory committees are supporting the program, the graduates of these trade preparatory courses are usually given

advanced apprentice ratings.

It can be said that instructors in these sheet metal courses are generally men of practical trade experience, and the direction and supervision is under experienced trade school men.

The vocational schools offering all-day training for the sheet metal trades offer training in layout work, general sheet metal work, and, in some instances, specialized forms of sheet metal work such as refrigeration and the forming and treating of new stainless metals which are used so extensively in equipment of kitchens and other household uses.

Schools Offering Federally Aided All-Day Training for the Sheet Metal Trades School Year 1940-1941

Alabama		Indiana	
Gadsden	Alabama School of Trades	Gary	Lew Wallace High School
Arizona		Kentucky	
Phoenix	Arizona Vocational School	Louisville	Ahrens Trade School
California		Maine	
Antioch	Antioch - Live Oak Union Junior - Senior High	Madison	Madison High School
Berkeley	Berkeley Senior High School	Maryland	
Crockett	Swett Union High School	Baltimore	Boys Vocational School
Glendale	Hoover Senior High School	Baltimore	General Vocational School No. 293
Los Angeles	Fremont Senior High School	Baltimore	School No. 57
Los Angeles	Lincoln High School	Hagerstown	Hagerstown High School
Los Angeles	Manual Arts Senior High School	Massachusetts	
Los Angeles	Riis Junior-Senior High School	Beverly	Beverly Trade School
Oakland	Central Trade School	Boston	Boston Trade School for Boys
San Jose	San Jose Technical High School	Everett	Everett Trade School
Connecticut		Haverhill	Haverhill Trade School
Meriden	Meriden State Trade School	Holyoke	Holyoke Vocational School
Stamford	Stamford State Trade School	Medford	Medford Vocational School
Georgia		Northampton	Smith's Industrial School
Macon	Lanier High School	Quincy	Quincy Trade School
Illinois		Springfield	Springfield Trade School
Chicago	Dunbar Vocational School (Negro)	Weymouth	Weymouth Vocational School
Chicago	Hancock Vocational School	Worcester	Worcester Boys Trade School
Chicago	Sheldon Vocational School	Michigan	
Chicago	Washburne Trade School	Pontiac	Pontiac Vocational School
Joliet	Township High School	Minnesota	
		St. Paul	St. Paul Vocational School

(Continued on page 78)

1940's

Most Imposing Fleche

Fleches have long been the ultimate expression of the architectural sheet metal contractor's ability to fabricate and ornament. This fleche, highly ornamented, is typical of today's practice of combining special and stock stampings with hand craftsmanship.

THE most imposing fleche completed in 1940, to our knowledge, is the delicate spire which soars above the crossing of the nave and transept of the impressive New Highland Park Presbyterian church in Dallas, Texas. The spire was sheathed in lead coated copper by American Sheet Metal Company of Dallas. The architect was Mark Lemmon; the general contractor, Henger Construction Co.

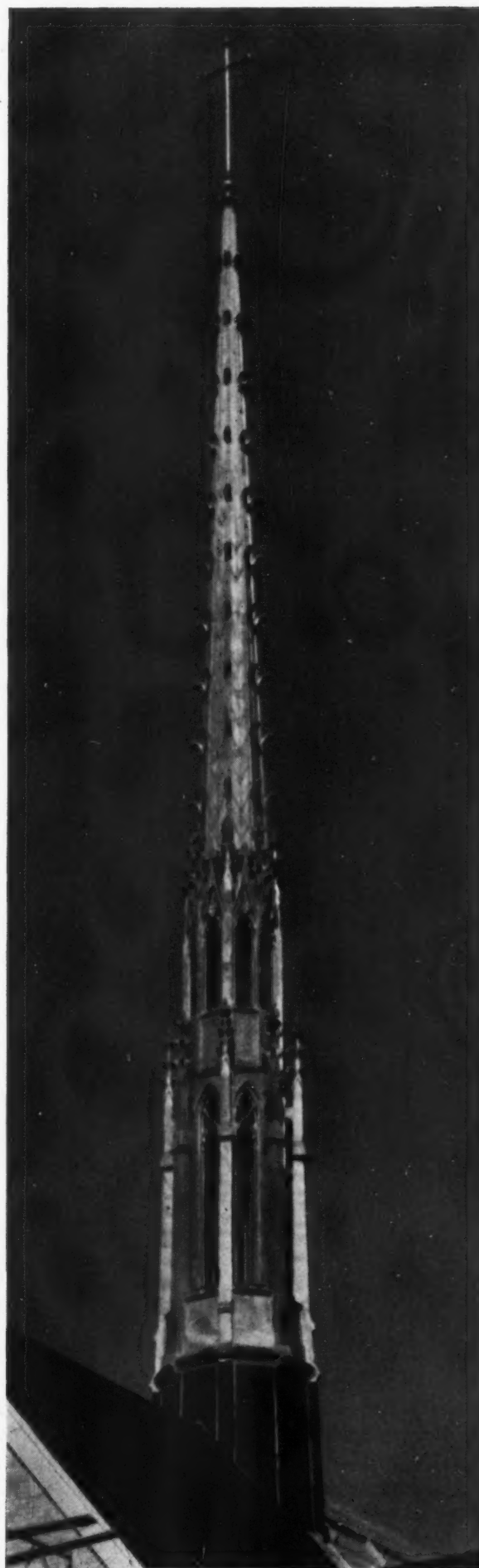
Combine Stampings and Shop Sections

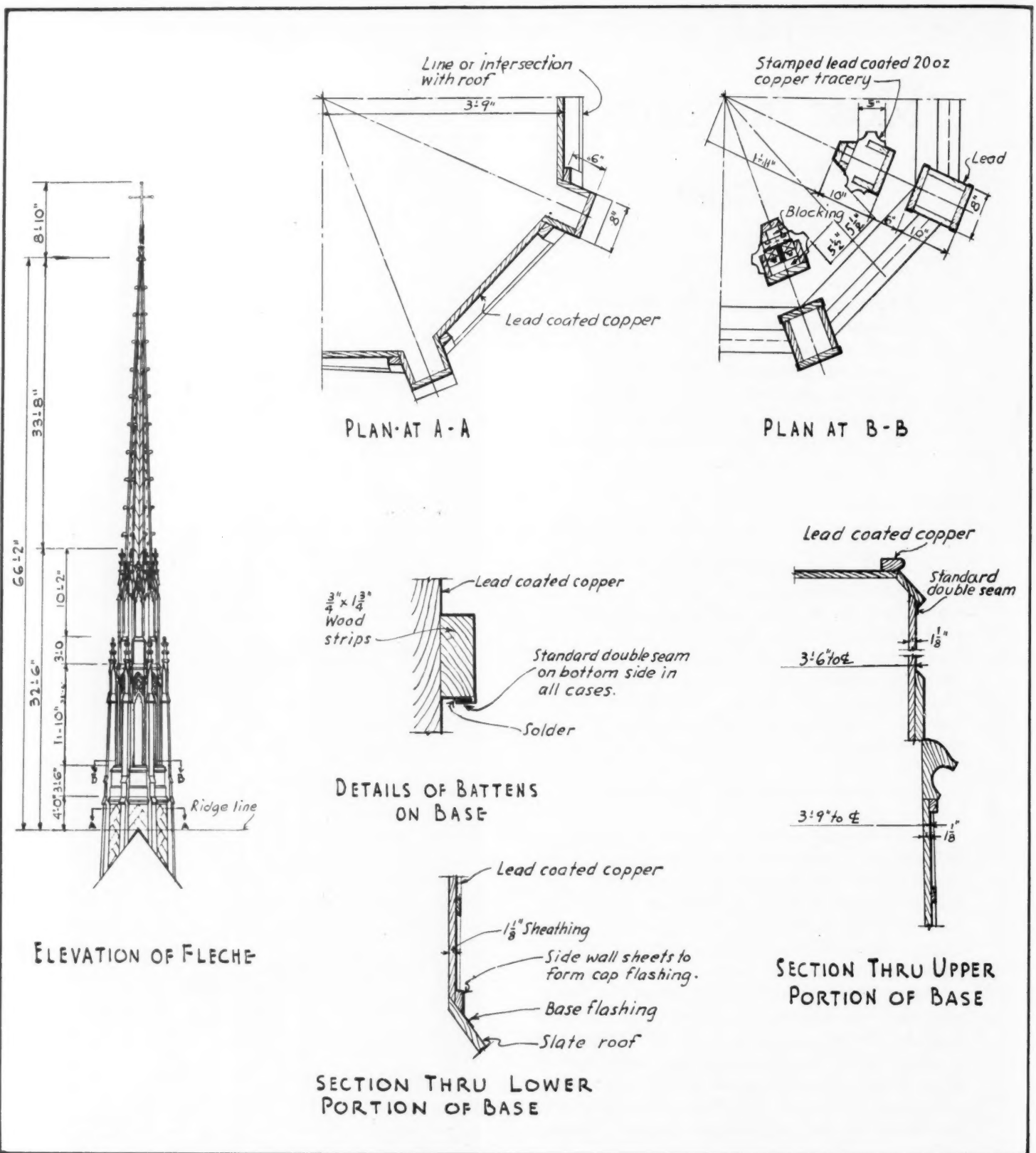
As has become common practice of late years, this spire is a combination of special shop-fabricated pieces and stampings of both stock and special designs. Miller and Doing of Brooklyn furnished the stamped pieces; American Sheet Metal Company made the hand work in their own shop and erected all pieces.

The photographs and sketches show the details of design and construction clearly. The spire is roughly divided into four parts by design and construction. The 8-foot cross, composed of white bronze 2-inch pipe and 6-inch balls welded into a single unit and the white bronze base were fabricated by The Dallas Metal Smiths. Henger

◆

The 75-foot spire consists of an enclosed and ornamented upper octagon and a double, open base section ornamented with tracery, butteresses, finals—stamped and shop fabricated. Details are shown on two pages following.

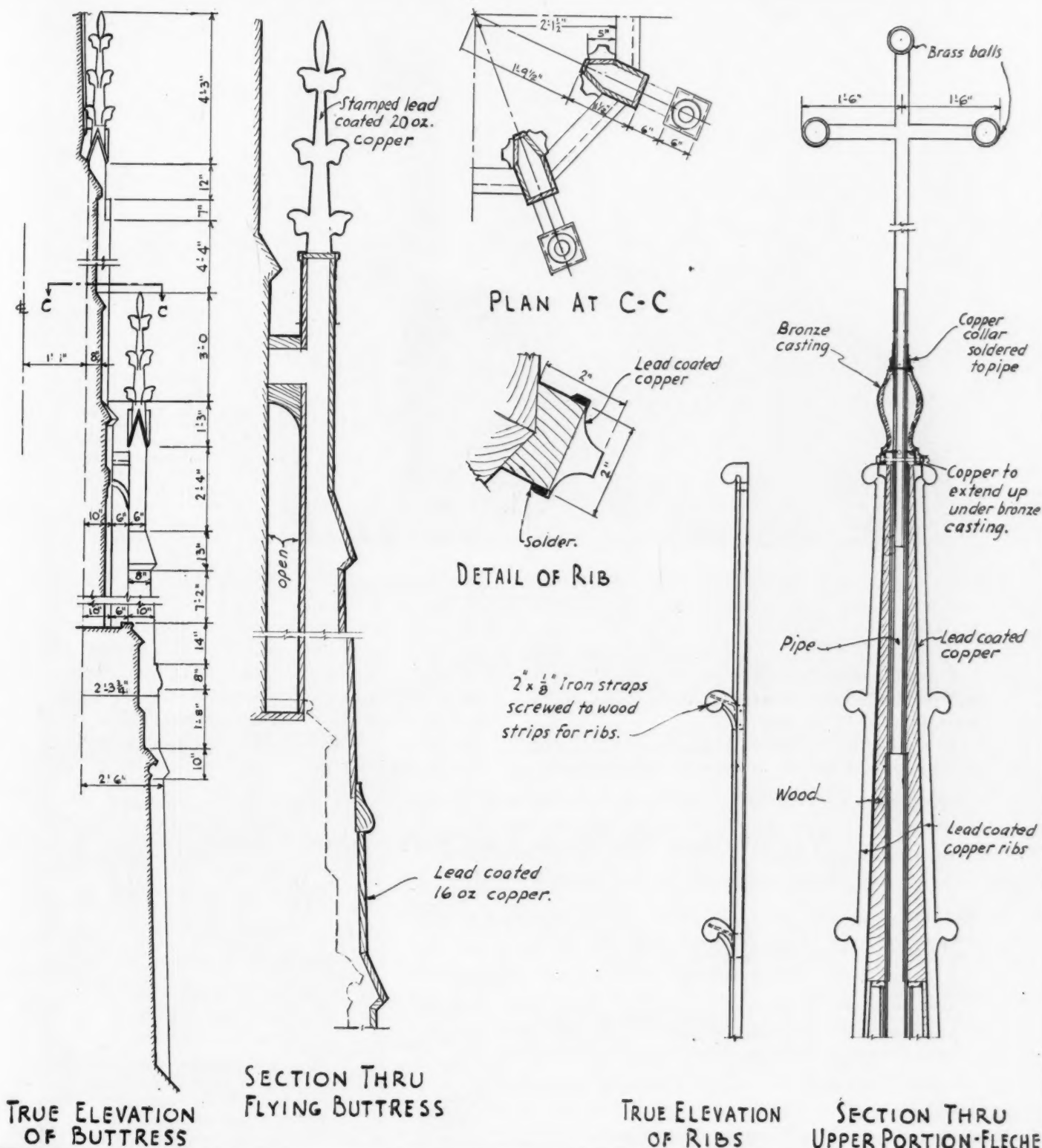




Construction Co. erected the cross and base on the prepared support. This support, incidentally, is a 1½-inch iron pipe, in a 2-inch brass pipe, in a 2½-inch iron pipe, in a 3-inch iron pipe—the combination extending more than 12 feet down the inside of the spire to insure firm support.

Below the cross there is some 37 feet of con-

verging, 8-sided spire (see telephoto photograph) composed of raised ribs ornamented with crockets and pan sheets ornamented with chevrons. The pans were stamped with chevrons integral by Miller and Doing. These panels are approximately 8 feet long. The ribs are flat faced with concave cheeks and are fastened to the turned up



edges of the pan sheets with a single lock and soldered. A detail shows the construction. These ribs were also stamped by Miller and Doing.

The crockets, which ornament the ribs, were also stamped and superimposed over the rib as shown in the detail of the rib.

Highly ornamented and effective are the two open sections below the spire. The smaller finials

which surmount the openings in the top section and the larger finials which surmount the flying buttresses of the lower section were stampings. The traceries of both sections were stamped as 12 pieces. The posts and buttresses of this portion of the spire were enclosed in lead coated copper on the job as shown in details A-A, B-B, C-C. Note that the buttresses stand free, thus requir-



ing a copper sheathing on four sides. The covering was assembled as sides joined by double seaming.

The base, as shown in the elevation sketch, but not completed in the photograph, is covered with lead coated copper panels ornamented by chevrons, planted in the field.

In sheathing the spire, American Sheet Metal Co. began application at several points depend-

ing on connections required for the different pieces. A full scaffold was employed, therefore, to permit work at any point as necessary. Duplication of pieces was possible since each of the sections occurs several times. But, because many parts of the spire were covered on the job, a great deal of preliminary layout was required in order that pieces cut and formed in the shop should fit exactly on the spire.

Vocational Schools Teaching Sheet Metal

(Continued from page 74)

Missouri

Kansas City
St. Louis

Manual High and Vocational School
Hadley Vocational School

New Jersey

Atlantic City
Irvington
Perth Amboy

Atlantic City Boys Vocational School
Essex County Boys Vocational School
Middlesex County Vocational School
No. 2

New York

Albany
Buffalo
New York

Philip Schuyler High School
McKinley Vocational High School
Bronx Vocational High School for
Boys
Brooklyn High School for Metal
Trades
Brooklyn High School of Automotive
Trades
McKee Vocational High School
Murray Hill High School of Building
and Metal Trades
New York Vocational High School for
Boys
Trott Vocational High School

Rochester

Edison Technical and Industrial High School

Jefferson High School
Madison High School
Monroe High School
Vocational High School
Troy Vocational High School

Troy

North Dakota

Wahpeton

State School of Science

Ohio

Akron
Canton
Toledo

Hower Vocational High School
Timken Vocational High School
Macomber Vocational School

Rhode Island

Providence

Providence Trade School

Tennessee

Whitehaven

Whitehaven High School

Texas

San Antonio
San Antonio

**Sidney Lanier School
San Antonio Vocational and Technical
School**

(Continued on page 114)

*All Crescent
Hacksaw Frames Are
Made This Better Way*



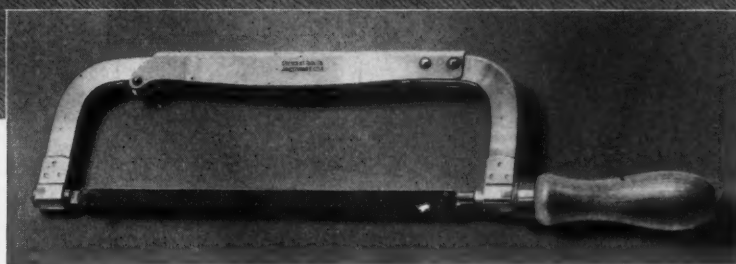
1 Blade Clips are spot welded to frame so they will not loosen. In destruction tests these parts hold under a strain sufficient to collapse the frame itself.

2 Hardened Pin, slightly tapered and pressed in under heavy pressure.

3 Tension Screws are turned and have continuous threads—not square stock merely threaded at the corners.

4 Ferrule is merely a ferrule—carries no part of the blade tension load.

5 Splined Bushing pressed into handle under heavy pressure. Blade tension strain exerted on a steel to steel contact—neither ferrule nor handle carry any part of load.



Crescent Hacksaw Frame No. 1042. Adjustable 8-12", 75¢
Also No. 1040, non-adjustable, in 8, 10 and 12" sizes at 60¢, 65¢
and 75¢, respectively.

● Crescent makes a complete line of Hacksaw Frames for practically every type of service. They are offered with wood, steel and composition handles. Prices range from 60¢ to \$2.00.

Even the lowest priced Crescent Frames incorporate the quality features, illustrated above, which assure not only better performance and greater utility, but add substantially to their years of serviceable life. No. 1042, illustrated, meets Government Specifications for straight handled Hacksaw Frames, as drafted by U. S. Federal Specifications Board.

Leading Hardware Dealers everywhere stock and sell Crescent Hacksaw Frames as well as other quality hand tools made by Crescent.

CRESCENT TOOL COMPANY

Jamestown, N. Y.

CRESCENT and Smith & Hemenway **TOOLS**

Here's a new profit field ... for alert sheet metal workers



Every day new fields for profit open up. Take, for example, small hangars at private flying fields. The present upswing in private flying and instruction means that hangar facilities must be expanded and improved—means that you have a genuine opportunity to cash in on these essential improvements and expansions.

Chances are good there's a C.A.A. or a private flying school near you. Contact the instructor in

charge. Sound out his needs, present or future. You'll find him receptive—and you'll find, too, that the many advantages of steel roofing and siding give you a ready-made sales talk. For a real sales-clincher, you can tell your prospect about Beth-Cu-Loy Galvanized Steel Sheets, the copper-bearing sheets with double life. You'll be giving him a really lasting job with Beth-Cu-Loy, yet it costs only a few cents more per sheet than ordinary steel.

BETHLEHEM STEEL COMPANY





President-elect John E. Peterson (left) receives congratulations from retiring president, Joseph Walter

IN June, 1937, a handful of Illinois sheet metal and warm air heating contractors met in Peoria for the purpose of re-organizing the then defunct Illinois State association. In January, 1938, the first annual convention was held and attracted a fair representation of Illinois contractors. This year, on January 15 and 16, two hundred and fifty tickets were sold for the annual banquet while the program attracted contractors from practically every important town in the state.

This rejuvenation has been due unquestionably to the untiring efforts of officers and committees who have worked continuously to build the Illinois association back to its standing as one of the active organizations in the country. In June, 1937, at the first preliminary meeting, Joseph J. Walter of Ottawa, Illinois, was elected president. He continued to serve until this year's January meeting when he was succeeded by John E. Peterson of Hinsdale. In testimony to his untiring efforts, the association presented Joe Walter with a handsome wrist watch. President

Illinois' Biggest Meeting

Walter, in accepting, asked members to realize that he alone could not have carried the load, that equal credit must be paid to the officers and directors who have worked with him.

This year's program was an excellent composite of entertainment, instructive addresses, business building ideas, and reports of activities which the association has undertaken since it was re-organized.

The Illinois Licensing Law

John E. Peterson, chairman of the warm air heating license act for the State of Illinois, reported that only a small amount of actual progress had been made during the past year toward enactment of the licensing act, but that during this time the phraseology of several sections had been changed in accordance with suggestions from contractors, from the association legal adviser and from the legislators who will introduce the bill at the present session of the legislature.

Chairman Peterson described one radical change as rewording of the clause covering branch managers of chain store units—the revision requiring that each branch must have a licensed engineer rather than one licensed engineer covering all branches of the organization. Mr. Peterson also emphasized that the bill is not a heating code; it simply sets up a method of licensing everyone now engaged in warm air heating work, with provision for renewal, with provision for examination of new persons entering the industry, and provides the necessary machinery for a heating code to cover the state wherever a local ordinance does not prevail. The bill encourages local heating codes. The State



Faces familiar at many, many Illinois conventions were once again present at the banquet. George Harms (third from left), Frank Eynatten (fourth from left), Joseph Walter (seventh from left), C. H. Lauerma (ninth from left) announced attendance at from 20 to 27 annual meetings.



Above—Howard V. Clark summarized steel sheet manufacture and the sheet market from the hand mill to today's continuous mill.

Below—A. C. Schroeder declared heating men were slow to "take-on" stokers, but are now an important factor in stoker sales.



department of registration will adopt a state code and will provide for inspection in areas where no local ordinance prevails.

Forced Air Increases Fire Hazards

Heating problems received considerable attention. Raymond G. Johnson, Chief of Inspectors, Division of Fire Prevention, Springfield, declared that all those in any way in charge of fire regulations are in favor of any licensing ordinance which will standardize design and installation practice and in doing so eliminate fire hazard. Mr. Johnson then went on to describe some of the hazards which have been accentuated by the general adoption of forced warm air heating and air conditioning. Old buildings having through fire walls and large stair and hallway sections open from basement to roof are definitely hazardous; these hazards being accentuated by blower systems unless such systems had fire doors, controls and other appurtenances which would shut down the blower and shut off the duct systems in case of fire.

Mr. Johnson also described as a hazard some contractors' methods of piercing fire walls with ducts which practice is definitely against all fire

regulations. He also condemned combustible duct lining because such lining usually burns slowly emitting large volumes of smoke which, while not dangerous in itself, causes great fear among occupants. He also pointed out that such duct insulation, once it catches fire, is very hard to get at to put the fire out. Dirty and oily filters were described as another dangerous practice. Mr. Johnson declared that one type of building definitely hazardous is the old-fashioned school with exhaust stacks opening into an attic which in turn is open to all ducts, and he said that such construction permitted fire to gain headway rapidly and to spread rapidly throughout the building.

Nessell—"We're Due for Changes"

C. W. Nessell, engineer, Minneapolis-Honeywell Regulator Company, described our industry as being in a state of change. The tinsmith, said Mr. Nessell, has now become a sheet metal contractor, the furnace man an air conditioning contractor but we have not "dressed up" our sales conversation nor have we improved our display methods in keeping with this change. We have also been slow in actually "delivering" some of the things we sold as for example, we have talked much about five or six air changes per hour but we seldom provide this number of air changes; we have recommended 35-45% humidity, but seldom provide means for obtaining such humidity; we have talked about the exceptional merits of mechanical warm air heating, but the industry generally has not obtained the prices which this type of installation warrants.

Mr. Nessell forecast remarkable changes and described such changes as use of sterilizing lamps in air conditioning systems to kill bacteria; electric precipitation as a means of removing dust; the diesel engine as a home unit to provide heat, light and power; and perhaps reversed refrigerating as a method of heating as well as cooling. Mr. Nessell said the safety of

C. W. Nessell (left) proposed the Diesel engine as a home heating, electric, cooling plant; electric precipitation and sterilizing lamps as "something to watch." Ralph Caylor (center) stuck a half dollar in a dollar tie and proved that "extra value" is the argument which sells any item. Today's furnaces have "extra value" he declared. H. C. Gurney (right) pointed to the CQ code as an indication of what must come in heating. The CQ code is presented in the January and February Artisan.





For the first time Illinois sold space for display. All space was taken and most booths had continuous patronage.

the industry lies in making our installations so good that such changes in practice will be delayed.

A. C. Schroeder of Malco Gear Company, Dalton, discussing stokers for residences, declared the stoker business really got under way as a result of many small foundries entering the stoker manufacturing business during the depression. Subsequently such concerns went broke or went out of the stoker business, but the combined sales activities of all the organizations engaged in selling stokers, really brought the stoker to the attention of the home owning public. Many such concerns did not know how to sell stokers or through whom to sell stokers, with the result that all sorts of stoker agencies were established. As a result of this, the stoker and heating industry has had to live down a lot of claims which never should have been made.

The speaker also pointed out that the heating man has been reluctant to adopt stokers as a saleable accessory and even more loathe to install stoker service departments, but today is beginning to realize the profit possibilities of stokers and more and more heating men are taking on a line of stokers.

Some 1941 Sales Problems

Selling quality heating plants was jointly discussed by H. C. Gurney, regional sales manager, and Ralph Caylor, district manager of Surface



Officers for 1941. Left to right—President Peterson, Vice-President Lauerman, Treasurer Eynatten, Secretary Johns.

Association Officers for 1941

President—John E. Peterson, Hinsdale
Vice Pres.—C. H. Lauerman, Galesburg
Secretary—W. W. Johns, Urbana
Treasurer—Frank Eynatten, Peoria

Directors

Joseph J. Walter, Ottawa
 Louis E. Dreihobl, Chicago
 Edward Pluth, Lincoln

Travelers' Auxiliary Officers

President—Erwin A. Eichenberger
First V. P.—E. H. Olsen
Second V. P.—H. H. Bartlett
Treasurer—J. B. Sauer
Secretary—Etta Cohn
Sargent—R. P. Wettstein (Active)
 George Harms (Honorary)

Directors

Ray Smelzer—*Chairman*

A. C. McKinley	T. L. Grantham
E. J. Cannavan	D. T. Earnest
J. M. Hackett	H. G. Sell
Joel W. Luck	H. Rhein
T. J. Coughlin	Lee Williams
George H. Harms	

Combustion Corporation. Mr. Gurney declared that complaints of improper installation and inadequate equipment are becoming noticeable; that there is a definite trend toward houses of lower sales price; that the heating industry has tried to go along with this trend toward lower cost houses by installing lower cost heating systems but that in too many cases this trend to cheaper installation has gone beyond the legitimate saving stage. An important development, declared Mr. Gurney, is the wider acceptance of gas as the ultimate heating fuel brought about by decreased gas rates, better gas service, higher Btu content gas, and better gas-heating furnaces. Mr. Gurney cited the Peoples Gas Light and Coke Company of Chicago CQ code as the best design and installation code adopted up to date in the

(Continued on page 116)

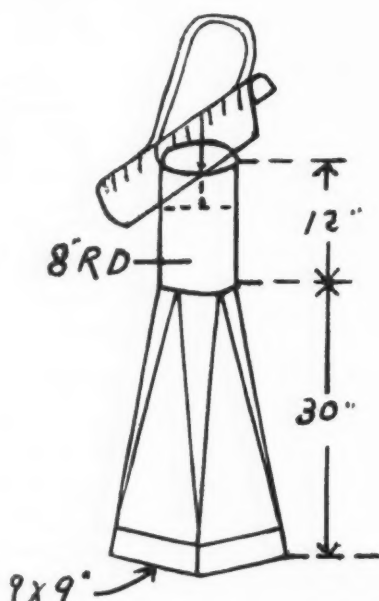
The PROBLEM CORNER

November Chimney Draft Problem

American Artisan:

You published a problem of ours covering poor draft in a chimney in your November, 1940, issue. You offered there a suggestion for chimney top to eliminate down draft and also suggested a forced draft blower to insure positive draft when the burner started.

We installed the chimney top shown in the sketch and so far the problem seems satisfactorily solved.



December Rudy Loop Problem

American Artisan:

In your December, 1940, Problem Corner you designated a duct with a dividing partition as a variation of the "Rudy Loop." I should like to add the following comment:

"The lay-out submitted in the December ARTISAN will work, but not quite as well as a single duct of the same size with no partition, because the partition increases resistance without any compensating advantage.

"As compared with a single duct, the loop has advantages, namely:

"It permits air to be taken from two sides of the plenum, thus preventing dead pockets and turbulence in the casing.

"It simplifies calculation of duct sizes, making error unlikely.

"It makes possible the use of shorter branches, the importance of which is indicated by the fact that if the average length of branches can be reduced 50 per cent, the amount of air delivered will be increased 41 per cent with the same pressure.

"As compared with two single ducts, the loop has this advantage, that each branch will receive its full capacity of air without tampering or dampering. In effect, each branch has two air supplies, one making up any deficiency of the other.

"Naturally, the loop should not be used in cases where the favorable factors are unavailable. Under favorable conditions, the loop may increase both capacity and efficiency of a system very greatly."

WILLIAM SCOTT,
Bradfordwoods, Pa.

Rating Large Furnaces

American Artisan:

Can you tell us how to obtain the latest code which gives the furnace rating formula. We also need the formula

used for rating furnaces having a capacity in excess of 294,000 Btu per hour.

B. C., Iowa.

Reply by
The Editors

We hesitate to answer your letter of October 29th regarding the rating of large furnaces because you do not say whether this is a gravity furnace or a forced air furnace.

Attached you will find page 35 of the February, 1939, ARTISAN, where a reader requested a rating formula for a very large furnace and Professor Konzo of the University of Illinois replied.

We do not know whether or not the University of Illinois has a formula for rating large furnaces, and we suggest that you write to Professor Konzo, Engineering Experiment Station, University of Illinois. We are sending a carbon copy of this letter to him so that he will be anticipating your request.

We assume that your question is raised because of Army camp specifications. Our understanding is that present Army specifications on large size units are based on a 10 lb. combustion rate at 70% efficiency, using 12,000 Btu coal.

Wage and Hour Law

American Artisan:

We are trying to get a definite ruling on a Wage and Hour Law clause. We want to know if sheet metal and heating in Michigan is considered "seasonal" or does it come under the 40-hour week. Carpenter contractors here claim "seasonal" exemption which permits them to work longer weeks some of the time. We wonder if we can claim this? We wrote our congressman but all he sent was a pamphlet.

R. S., Michigan.

Reply by
The Editors

On receipt of your letter we 'phoned the Chicago regional office of the Department of Labor and they claim that there is no way by which you are entitled to exemption from the 40-hour provision in the Wage and Hour Law, providing that you classify under interstate commerce.

The Chicago office says further that no exemption is granted for seasonal business or short construction periods in any northern city.

If you still feel that you should classify for some exemption, write a letter to Thomas D. O'Malley, Regional Director, U. S. Dept. of Labor, Wage and Hour Division, 1200 Merchandise Mart, 222 W. North Bank Drive, Chicago, Ill. In this letter set forth your reasons for believing you are entitled to exemptions. Ask for a copy of Form AD-85, which you must fill in and return in support of your claim for exemption. If carpenter contractors are working more than 40 hours per week without time and one-half, set forth the facts in this letter in order that the Chicago office may investigate.

It is our understanding that all claims similar to yours are handled in a routine manner and you should proceed according to routine in order to obtain a valid claim for exemption. If you do not do this you may find yourself in trouble later on.

Noisy Wall Stacks

Question:

We have been experiencing trouble in our forced air jobs with cracking noises in wall stacks going to the second floor of residential jobs.

We have increased the humidity in certain jobs in that we thought the drying out process of the wood was in some measure the cause of the cracking noises. We have also increased the volume by decreasing the register temperature of the delivered air and have gone so far as to put on canvas connections on certain branches. All of this seems to have been of no avail and our customers are still complaining.

Reply by

Professor S. Konzo

Special Research Assistant Professor
University of Illinois

We have had some experience with wall stack noises in various installations, and have been able to suggest a very definite remedy for this difficulty.

Practically all sheet metal workers build their wall stacks from 8 ft. (96") iron, inasmuch as these stacks can be quickly installed in one or two pieces. Material and labor can be saved in making stacks of this length out of standard sheets of iron, due to fewer joints in this length of stack. However, when these stacks are made up in the shop, seldom are the sheets absolutely flat. Usually there is a slight wave or buckle in any galvanized sheet. If an ordinary Acme lock is used and is hammered down, tension and stress of the entire stack is actually built into the stack itself. When the stacks are installed they are literally suspended in the walls and not rigidly fastened in place. These wall stack fasteners are usually a plain strip of galvanized material riveted or soldered to the stack, the other end being mailed to the studding. Even tho the stack is of sufficient material thickness to not "bang," due to long unbraced flat surfaces, the moment heat is applied the stack tends to "creep," and this creeping is localized at the various joints or wavy spots in the sheet, unless slip joint construction at all vertical and horizontal seams is provided to act as an expansion joint. Temperatures in the duct are not sufficiently high to ever eliminate the stress originally built into the sheet or the stack itself.

Our suggested remedy is as follows:

Use shorter lengths or sections of wall stack when roughing in the job, so as to provide rigid horizontal connections and vertical stiffness to the stack. Use a rigid supporting brace made of an "L" shaped section, that may be plastered over, for holding the wall stack at each joint. Provide, if possible, a slip type of joint when making up this material in the shop so that any expansion, twist or distortion in the original sheet, its fabrication, or its installation, may be taken up in the stack itself. The actual lineal expansion of galvanized iron, whose temperature may be changed as much as 100 deg. for a 20 or 30 ft. length of stack, must be compensated for, otherwise noises will result. If too light a gauge of material is used in making up the stack, flat surfaces, regardless of their construction, will cause considerable "banging."

Warm Air Leaders Reverse

American Artisan:

We added a blower to a cast iron furnace on which two warm air runs are considerably shorter than other leaders. We experienced a reversal of flow in the short leaders as soon as the fan stopped. When the fan was added we took down the furnace and baffled the casing in a manner heretofore satisfactory. Five leaders connect to second floor stacks. All leaders are 10-inch excepting one 9-inch. There are four leaders to first floor registers, all 10-inch pipe.

"A" is almost directly above the furnace and about 3 feet long. "B" is about 6½ feet long. We believe that the strong stack effect of the second floor runs plus the resistance of a fairly complicated return air system are causing the reversal. With this idea in mind we dampered all stacks

down with little result. We next installed "sizing cones" in the warm air pipes to make the working area of the pipe correspond with calculated pipe sizes for forced air flow. This did not effect the reversal.

Then we built "heat robber" elbows on pipes A and B with the idea of making the frictional resistance of A and B equal to the resistance of the return system. We have not yet cured the trouble.

L. H. N., Indiana.

Reply by The Editors

It seems to us as though you have done all of the things usually recommended for a problem of this kind with the exception of changes in the return air system. We judge from your letter that you have not made any changes in the return system.

If the friction in the return system is so high that warm air leaders A & B reverse, then we believe that you might change the operation by revamping the return system. However, you do not give us any information on this return system and we would like to have you send us a rough plan layout showing the locations of the returns and the sizes of each return run. Please indicate also the length between each return grill and the furnace.

Sizes for Straight Plenums

American Artisan:

We use round casings with round to square sections about 12 inches high and above this a square plenum. Mains are taken out of the plenum sides. We would like to know how to size these plenums.

Our plenums range from 8½ inches to 4½ feet high, depending on basement headroom. It would seem the higher the plenum the smaller the cross section area required. Is there some rule covering this plenum area?

Various furnace manufacturers have suggested—

308 sq. in. pipe area with a 452 sq. in. plenum
344 sq. in. pipe area with a 522 sq. in. plenum (22 in. firepot)
408 sq. in. pipe area with a 576 sq. in. plenum (22 in. firepot)
292 sq. in. pipe area with a 576 sq. in. plenum (22 in. firepot)
348 sq. in. pipe area with a 784 sq. in. plenum (24 in. firepot)

A heating engineer says—"Use total area of warm air leaders plus 10 per cent for plenum area. Books on warm air heating do not agree. Overton says—"Plenum should be as large as possible within practical limits." Konzo says—"Use large plenum chamber over the furnace." Furblo Institute Bulletins say—"The area of the center opening in a baffle plate (in sq. in.) be not greater than 0.36 times the CFM handled by the system, and another, "plenums should be at least 24 inches deep."

J. H. M., Canada.

Reply by The Editors

So far as we know, the straight-up plenum for either gravity or warm air has not been definitely formulated as to proper dimensions of the plenum. If you are encountering a difference of opinion as to the area of the plenum, this is only natural and we believe all the suggestions will work.

We believe that if the square inch area of the plenum is as large as the total square inches of warm air leader pipe taken off the plenum, this will constitute the minimum area. We do not believe there is any objection to larger plenums since there is a relationship between the diameter of a round casing and the Btu heat output in square inches of leader pipe of that furnace and you certainly would not make your plenum larger than the diameter of the casing.

The gist of the operation seems to be that the plenum becomes a mixing chamber in which static pressure equals 100%, or the total pressure, and there is no velocity pressure present. This being the case, dimensions are not critical excepting as you may get some radiant heat loss from the exposed metal. This, of course, can be overcome by insulation.

BOOKKEEPING —

A Plan of Accounts [Part 5]

By Joseph G. Dingle, C. P. A., Ottawa, Ill.

HAVING discussed in some detail the various accounts necessary to the proper operation of the typical shop, we now take up the matter of presenting the results of operation as shown by these accounts. Of course, some small business men are content to wait until the end of the year to know what they are actually doing in the way of profit making, but the modern business man wants to know at the close of each month what that month has done *for* him, or, shall we say, *to* him. It is, in our opinion, far better to know at the end of the month what that month has done, than to wait until the end of the year. If conditions are unfavorable, there is still time to do something about it. Your chances for success are 12 to 1 on the monthly basis, over the annual basis. Again, if something goes haywire, as it frequently does in business, knowing it at the end of the month permits you to review mentally the conditions contributing to that upset, while on the yearly basis, you are lost; you cannot even say what part of the year contributed most to the upset.

Watch Sales and Profits

There are several elements which require constant watching in business. The first is sales volume; then comes the gross profit realized in those sales; then comes the overhead expenses. Without adequate sales volume, it is difficult, if not impossible, to realize a profit. Granted a good volume of sales, it is possible, and quite probable, that lack of attention to the cost of the sales will result in little gross profit, if any. Even with adequate sales volume and controlled cost of sales, it is easily possible for the overhead expenses to eat up all the gross profit. In presenting the operating statement, we will show the effect of each of these elements on the final net profit.

A typical operating statement, taken from the bookkeeping records heretofore discussed, would be as is here shown. We recommend the use of this form for a monthly operating statement showing the month only and the same form, to contain the cumulative figures for the year to date. In other words, for a business on a calendar year,

this form would show, for January, the January operating results. For February, the first statement would show the February figures only and the second statement would show the totals for the two months.

How to Establish Gross Profit

In discussing this operating statement, we first will treat with the figures which produce the gross profits. Note, if you will, that we have shown each sales department separately, starting with the Gross Sales, from which we deduct the Returns and Allowances, to arrive at the Net Sales. From the Net Sales, we deduct the Cost of Sales, and arrive at the Gross Profit. All of these figures are taken from the respective accounts in the ledger and the management, upon receiving this statement from the bookkeeper should analyze the month's operations somewhat as follows:

GROSS SALES: How has the month's gross sales for each of the several departments held up with the estimate of business? If the volume has been attained, that much is satisfactory, unless, of course, the major portion of the total sales volume should be in the Sales of Appliances, Wholesale, where the margin of profit is small.

RETURNS AND ALLOWANCES: While some returns and allowances may be expected each month, the prime object here is to note that they have not been above the average. If the returns and allowances of appliances is unusually high, it would serve to indicate that the appliances sent out were poorly sold, or, perhaps, had proven unsatisfactory to the prospective customer. This may have been due to the fact that in selling, there was some over-selling; such as promising results which were impossible of attainment. This kind of selling is very dangerous. What about allowances for price errors, or for faulty workmanship? Such errors are expensive, both from the point of price reductions, and from the standpoint of satisfied customers.

NET SALES: Regardless of the gross sales, it is the net sales upon which profits are computed and if, after looking into the matter of

OPERATING STATEMENT

Department	Gross Sales	Returns & Allowances	Net Sales	Cost of Sales	Gross Profit
Sales of Material.....	\$....	\$....	\$....	\$....	\$....
Sales of Labor.....
Sales of Appliances.....
Sales of Appliances, Wholesale.....
Total Gross Sales.....	\$....				
Total Returns & Allowances.....		\$....			
Total Net Sales.....			\$....		
Total Cost of Sales.....				\$....	
Total Gross Profit..					\$....
Deduct Operating Expenses:					
Advertising				\$....	
Bad Debts	
Collection Expense	
Delivery Expense	
Depreciation	
Dues and Subscriptions.....				
Freight and Drayage.....				
Heat, Light and Water.....				
Insurance—Fire	
Insurance—Liability	
Insurance—Workmen's Compensation..				
Indirect Labor	
Machine and Tool Expense.....				
Office Expense	
Rent	
Repairs—Delivery Equipment	
Repairs—Shop	
Salaries—Office	
Salaries—Selling	
Selling Expense	
Shop Supplies Used.....				
Taxes—Real Estate and Personal.....				
Taxes—Old Age Benefits.....				
Taxes—Unemployment Compensation..				
Telephone and Telegraph.....				
Travelling Expenses	
Total Operating Expenses.....					\$....
Operating Profit					\$....
Add Other Income:					
Discount Taken				\$....	
Interest Earned	
Commissions Earned	
Total Other Income.....					\$....
Total					\$....
Deduct Other Expenses:					
Discount Allowed				\$....	
Interest Paid	
Income Taxes	
Total Other Expenses.....					\$....
FINAL NET PROFIT					\$....

gross sales volume and the returns and allowances, all matters requiring attention have been taken care of, we can pass on to the next step.

COST OF GOODS SOLD: The principal measure of this element of cost is the Gross Profit. If, however, Gross Profit in any or all of the departments is low, we must then look to the cost of goods sold for the trouble. Of course, a low gross profit may be caused by a low gross selling price, or a high returns and allowance deduction,

but if the gross profit is low, good business practice demands that we look into the cause of such a showing.

GROSS PROFIT: Here we have, for each sales department, the net results of the operation of the sales, returns and allowances and the cost of goods sold. By the time we have arrived at this point, we are rather well acquainted with the operations of sales and if we have managed to maintain the sales volume and realize the normal

gross profit, we can now pass on to the next step. As we have stated before, this gross profit is somewhat of a controlled figure, in that your competitors make, or tend to control, your selling price; and the wholesaler and your competitors have a bearing on the cost of your sales. Our problem now is to so manage the overhead expenses as to have some of this gross profit left after taking care of the overhead.

OPERATING EXPENSES: Regardless of the perfection of the sales and cost of sales, this department of the business can destroy all profit possibilities if allowed to run away with itself. Analyze the several expense accounts and ascertain that each is as low as it could be, consistent with good operation results and if the percentage which this overhead expense bears to the total net sales is too high, there are only two things to do. Either get a larger sales volume, or reduce expenses. Of course, if sales volume can be increased and overhead expenses reduced, the effect on the final operating profit will be quite substantial.

For the purpose of illustrating the effect of any one of the several elements on the final operating profits, we will use some round figures. Let's assume a shop with an average gross sales of \$30,000.00, with an average estimated overhead of \$6,000.00, and a figured net operating profit of, say, 10 per cent, or \$3,000.00. The predicted figures would be as follows:

	Annual		Per Month
Gross Sales	\$30,000.00	100.00%	\$2,500.00
Cost of Sales.....	21,000.00	70.00	1,750.00
Gross Profit	\$ 9,000.00	30.00	\$ 750.00
Overhead Expenses	6,000.00	20.00	500.00
Operating Profit ..	\$ 3,000.00	10.00%	\$ 250.00

Now, first, we will assume that the sales volume drops to around \$2,000.00 for the month, with the cost of the sales remaining at the 70% of sales, as above. The annual estimate contemplated an average monthly sales of \$2,500.00, and we have for the month only \$2,000.00. Overhead expenses are assumed to have remained constant, or at an average of \$500.00 per month. The resulting figures would appear as follows:

(Illustration No. 1)

Gross Sales for		
Month	\$ 2,000.00	100.00%
Cost of Sales.....	1,400.00	70.00
Gross Profit	\$ 600.00	30.00
Overhead Expenses	500.00	25.00
Operating Profit ..	\$ 100.00	5.00%

Here, instead of the average of \$250.00 per

month in operating profit, we have only \$100.00 and that with only a drop in gross sales of \$500.00—from an estimated total of \$2,500.00 per month to only \$2,000.00. That \$500.00 of gross sales would have carried, at 30% a gross profit of \$150.00, and this is the amount of the reduction in the final operating profit for the month. Overhead expenses remained stationary.

Now, for the purpose of illustrating a reverse showing, let us assume that instead of a monthly sales volume of \$2,500.00, we have a \$3,000.00 month. The figures would be as follows:

(Illustration No. 2)

Gross Sales	\$ 3,000.00	100.00%
Cost of Goods Sold	2,100.00	70.00
Gross Profit	\$ 900.00	30.00
Overhead Expenses	500.00	16.66
Operating Profit ..	\$ 400.00	13.34%

In this illustration, with monthly overhead expenses remaining constant, and sales volume increased \$500.00, operating profit has increased from \$250.00 to \$400.00, due to the fact that the extra \$500.00 of sales, carrying a gross profit of 30%, produced an extra \$150.00 of gross profit.

Another illustration is for sales volume to remain constant at \$2,500.00, overhead expense to be constant, and cost of sales to increase from 70% to, say, 80% of sales. The result will be:

(Illustration No. 3)

Gross Sales	\$ 2,500.00	100.00%
Cost of Goods Sold	2,000.00	80.00
Gross Profit	500.00	20.00
Overhead Expenses	500.00	20.00
Operating Profit .	0.00	0.00

In this illustration, the fault lies in the shop, or, perhaps in the estimating. The cost of the sales consumed too much of the sales dollar.

Now, for the purpose of illustrating the effect of an increased overhead expense, we will assume normal sales and normal cost of goods sold and operating expenses of \$600.00 instead of the estimated \$500.00. The result will be:

(Illustration No. 4)

Gross Sales	\$ 2,500.00	100.00%
Cost of Goods Sold	1,750.00	70.00
Gross Profit	\$ 750.00	30.00
Overhead Expenses	600.00	24.00
Operating Profit ..	\$ 150.00	6.00%

Here we find the increased overhead expenses

(Continued on page 120)

Association ACTIVITIES

National Warm Air Changes Address

Since January 13, 1941, the National Warm Air Heating and Air Conditioning Association has been located at 145 Public Square, Cleveland, Ohio.

George Boeddener, Managing Director.

Chicago—North Side

The Furnace-Air Conditioning Sheet Metal Institute, Chicago, is sponsoring an educational program.

Thursday, January 23, was the annual Ladies Social Night. The feature of the evening was a travelogue film in color taken up in Canada, showing fishing, hunting and views of that great neighbor country, furnished by Lester Wise, a representative of the Milcor Steel Company. Mr. Wise also furnished the beer refreshments. The Institute provided a roast beef plate lunch, coffee, and cake.

After the travelogue, and the tables were cleared away, there was music and dancing. About 100 attended.

John Novak,

Chairman Entertainment Committee,
Louis E. Dreihobl, President.

New York State

The New York State Sheet Metal, Roofing & Air Conditioning Contractors' Association, Inc., sent a two-page letter to all members on January 29, with up to the minute news for progressive roofing, heating and sheet metal contractors, and calling attention to the annual convention scheduled for March 25, 26 and 27 at Syracuse.

Most members of our industry have recently experienced a very successful season, giving them a foretaste of a new man-made prosperity which appears to be heading for new heights during the next few years. Whether or not we are to pay return dividends on this new prosperity, we definitely should cash in on its present swing to increased business now.

Many jobs that could have shown a nice profit for the installer during the last few years, were beaten down and down by using one contractor against the other, as a price target, until the job shows no profit. Price factor must again enter the picture, but in a new and different manner. These next few years must show a profit for you and your fellow contractors. Let's resolve now to learn more about our industry, through the facilities being offered by the National Warm Air Heating Association, the Michigan State College, and our leading trade journals.

Professor S. Konzo from the Department of Mechanical Engineering, University of Illinois, will lecture and answer questions for a full afternoon on Wednesday, March 26th, at the coming State Convention at the Onondaga Hotel, Syracuse, N. Y.

The Merchandisers group, affiliated with our State Association, has a contest amongst themselves for new members for the State Association. This group is planning to hold Open House and an evening of entertainment on Tuesday evening, March 25, at the Onondaga Hotel—free for all contractors in attendance at the convention.

Clarence J. Meyer, State Secretary.

Milwaukee

The Milwaukee Sheet Metal Contractor's Association held their annual meeting at the Medford Hotel, Milwaukee, on December 3rd, called to order by President Angelo Hoffmann with twenty members in attendance. The newly elected Board of Directors met immediately after their election—Mantei, Belau, Geier, Kramer, Schaar, Hoffmann, Podolske, Marth, Walters and Biersach. The following officers were elected:

President—Angelo Hoffmann
Vice President—Joseph Geier
Secretary—Arthur R. Podolske
Treasurer—Frank Kramer
Serg. at Arms—Al. Walters
Executive Secretary—Paul L. Biersach

The following were appointed as chairmen of their respective committees, each to elect his own committeemen and report at the next meeting:

Labor—Joseph Geier
Legislative—Arthur Mantel
Membership—Arthur Podolske
Building Congress—Walter Belau
Trade Relations—Robert Schomann
Publicity—Martin Schaar
Entertainment—Al. Walters

Paul L. Biersach, Executive Secretary.

Propeller Fan Manufacturers Meet

The Propeller Fan Manufacturers Association, General Motors Building, Detroit, held its annual meeting on Thursday, January 9, 1941, at the Hotel Statler, St. Louis.

The following were elected to office for the coming year:

President—E. W. Petersen, American Blower Corporation.
Vice President—A. R. Stephan, DeBothezat Ventilating Equipment Division.
Secretary-Treasurer—V. C. Shetler, Detroit.

Coming Conventions

1941

Feb. 25-27—Ohio Sheet Metal Contractors' Association. 1941 Convention. Deshler Wallick Hotel, Columbus. Carl M. Gundlach, Secretary.

Mar. 4-6—Michigan Sheet Metal, Roofing, Heating and Air Conditioning Contractors' Association. Annual. Kalamazoo. E. C. Spraker, Secy., 1560 Mackinaw Road, Grand Rapids.

Mar. 17-22—Oil Burner Institute. Exhibition and Annual Convention. Commercial Museum and Benjamin Franklin Hotel, Philadelphia. G. Harvey Porter, Man. Dir., 30 Rockefeller Plaza, New York City.

Mar. 24-27—Warm Air Heating Conference. Tenth Annual. Michigan State College, East Lansing, Michigan. Lorin G. Miller, Professor.

Mar. 25-27—New York State Sheet Metal, Roofing and Air Conditioning Contractors' Assn., Inc. Annual. Hotel Onondaga, Syracuse. Clarence J. Meyer, State Secretary, 567 Genesee St., Buffalo.

Apr. 18-19—The Roofing & Sheet Metal Contractors' Association of Florida. Annual. Roosevelt Hotel, Jacksonville. L. A. Burgess, Secretary-Treasurer, 915 N. Poinsettia Ave., West Palm Beach.

May 15-16—Sheet Metal and Roofing Contractors' Association of Pennsylvania. 1941 Convention. Penn Albert Hotel, Greensburg. M. F. Liebermann, 1411 Merchant St., Ambridge, Pa.

Association Activities . . .

Fox Valley

The Fox Valley Furnace & Sheet Metal Contractors Association held its annual election of officers at a meeting on January 20 in Elgin, Illinois.

The re-election of President Stowell to serve another year was by unanimous standing vote as an expression of appreciation for the excellent work carried on in 1940, and confidence that under President Stowell, 1941 will be an equally progressive year for the organization. In accepting the presidency, Mr. Stowell outlined briefly some of the highlights of the various meetings during 1940. He also summarized some of the changes in general shop practice, which have occurred during the last year.

In accordance with Fox Valley procedure, one speaker was present, J. D. Wilder, editor American Artisan, who discussed some of the management problems to be expected in 1941. The problem of general taxation for the small business man was outlined and the suggestion was offered that contractors objecting to the ever increasing taxes on business can well afford to join with tax complaint bodies which are organizing all over the country.

The speaker predicted that gravity warm air heating would be as much of a factor in 1941 as during 1940, when government reports show approximately one-half of all furnaces manufactured and installed were gravity—cast iron or steel.

Two active fields in sheet metal work were predicted; these fields being material and fume handling for the modernizing and re-equipment of factories engaged in re-armament work. The other field which looks favorable is the fabrication of metal specialties, particularly parts and sub-assemblies for re-armament products which can be fabricated in sheet or plate and welded in preference to the old fashioned cast iron or machine parts.

Florida

The 1941 convention of the Roofing and Sheet Metal Contractors Association of Florida will be held April 18th and 19th, at the Roosevelt Hotel, Jacksonville.

B. E. Erwin, Director of Safety for the Florida Industrial Commission, will be present at the convention and speak on industrial safety, keeping in mind particularly the roofing and sheet metal contractors. An effort is being made to secure a speaker from the Unemployment Compensation Division to present figures in connection with contributions made by roofing and sheet metal contractors and claims made by unemployed.

Bill Palmer has just signed up Barron Ventilator Manufacturers at 2021 N. Miami Avenue, Miami, as a new member for 1941. We hope that the owner, Paul Barron, will attend the Jacksonville convention in April.

Jim Irwin writes that Walter Taylor of Leesburg is at U. S. Veterans Hospital at Bay Pines, Fla., with a broken hip and arm.

L. A. Burgess, Secretary-Treasurer.

Chicago—Hammond, Indiana

The Associated Air Conditioning & Sheet Metal Contractors met at the hall of Associated Air Conditioning and Sheet Metal Contractors, 11145 South Michigan Avenue. The meeting was called to order by President John Bierman, with 37 present.

Speakers included Ed. Carter of Snips on the new developments of the sales tax and a report of the Illinois State Convention; John Titterington, past president of Master Furnace and Sheet Metal Association, Chicago; Louis W. Reining of Thermo-Drip Humidifier; and a few other guests of the evening.

Mr. Block, Public Relations Representative of Carnegie-Illinois, spoke as a representative of Scully Steel Corporation on steel and presented a three-reel picture showing the production of steel from start to finish.

Scully Steel Company's local representative, Ed. J. Reickenback, spoke of the merits of his company and their service to the dealers in our territory.

The meeting adjourned at 10:50 and enjoyed a social time eating Bill Geirman's lunch and refreshments until near midnight.

A. R. Harris, Secretary.

New York

Roofing & Sheet Metal Crafts Institute, Inc., 60 East 42nd Street, New York City, held a ball on January 25 at the Hotel Astor, with more than 450 sheet metal contractors, roofers, warm air and ventilation men, with their wives in attendance. Jimmy Lyons was Master of Ceremonies.

President Alfred E. Neulander of the Neulander Roofing & Sheet Metal Co., Inc., was introduced by Irving Payson Zinbarg and gave a half-minute welcome to everybody.

Richard H. Freyberg, chairman of the board of the Institute, was then introduced, and presented with a 10-karat gold Waltham watch on behalf of the Institute, inscribed "Presented to Richard H. Freyberg, President 1937-1940—Roofing & Sheet Metal Crafts Institute, Inc., January 25th, 1941."

Mr. Murphy, chief examiner of the City of New York for Rigger Permits, took a bow. Mr. Freyberg presented Bernard Sachs, editor of American Roofer, and Edwin Scott, editor of Sheet Metal Worker, with a sealed beribboned certificate of honorary membership in the Institute.

I. P. Zinbarg, Executive Secretary.

Air Conditioning Contractors' Alliance

Boslough Heating Corporation played host to the Air Conditioning Contractors Alliance, Chicago, at its annual meeting January 22nd, 1941. Under the direction of Mr. Boslough, the members of his company served a triple excellent dinner that covered all the ground between charcoal broiled steaks and finishing off with pumpkin pie.

At the meeting preceding the dinner the following were elected as officers and members of the board of directors for 1941:

Jay Boslough.....	President
Boslough Heating Corporation	
W. G. Burgraave.....	Vice-President
Alladen Engineering Co.	
John J. Murphy.....	Director
Yearound Air Conditioning Co.	
B. E. Olson.....	Director
Columbia Sheet Metal Works	
J. Harvey Manny.....	Director
Robinson Furnace Co.	
H. Clausen.....	Director
Anchor Sheet Metal Works	
Fred L. Lensing.....	Director
A. W. Lensing Sons, Inc.	

After the dinner an inspiring talk on "Selling Air Conditioning Equipment" was presented by Arthur Frazee of Dowagic Steel Furnace Co. The theme of his talk was built around successful selling techniques and that of building values a very thoughtful presentation which was thoroughly enjoyed by the members.

The Alliance is entering its fourth year of activity. Mr. Boslough immediately appointed a committee to undertake serious consideration of a program with the view of enlarging and improving the scope of activity.

R. Hamlin Petty, Sr., Secretary.

Oil Burner Institute

The National Oil Burner Progress Exhibition, sponsored by the Oil Burner Institute, will be held March 17-22, 1941, in Philadelphia. Seventy-seven exhibitors had reserved space on December 23.

C. F. Curtin, Secretary, 30 Rockefeller Plaza, New York City.

New PRODUCTS

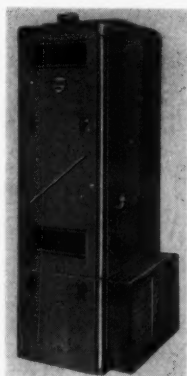
For your convenience a number has been assigned each item. Circle the items in which you are interested on the coupon on page 98 and mail to us.

● Indicates product not listed in 1940 Directory.

△ Indicates manufacturer not listed in 1940 Directory.

1—June-Aire Vertical

American Foundry & Furnace Company, Bloomington, Ill., announces the new June-Aire vertical model winter air conditioner—a gas-fired unit of entirely new design for small and medium sized homes. The casting, burn-



ers, blower, and casing are all new and A. G. A. approved.

The cabinet is finished in Hammerloid blue, a baked-on enamel finish, with chromium fittings. Floor space required is 20 x 30 in. The casing is air insulated. The cabinet incloses all the control instruments.

2—Nibbling Machine

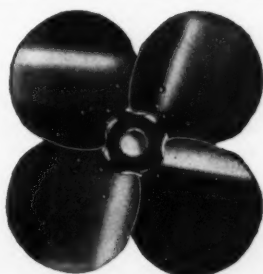
Andrew C. Campbell Division, American Chain & Cable Company, Inc., 929 Connecticut Ave., Bridgeport, Conn., announces a new wide-range



Campbell nibbler. The No. 250 will handle stock up to 72 in. wide. The stroke of the machine is adjustable to the thickness of metal. Three standard speeds are provided.

3—4-Blade Propeller

The Torrington Manufacturing Company, Torrington, Conn., announces a 20-in. 4-blade propeller fan



to complete its Airstocrat line which now includes 8, 10, 12, 14, 16, 18 and 20-in., supplied with either steel or aluminum blades, in a variety of pitches.

4—A. C. Arc Welders

The Emerson Electric Manufacturing Company, St. Louis, announces a line of A. C. arc welders to include 4 models with maximum capacities of 75, 150, 200 and 300 amperes.



Features include clear vision selector panel with various heats plainly etched in white; heavy duty on-and-off switch on selector panel; drip-proof storage space between selector panel and cabinet front for accessories; protective panel cover; portable, compact, streamlined design with ventilating louvers; and transformer coils wound with copper magnet wire having flexible double-spun glass insulation.

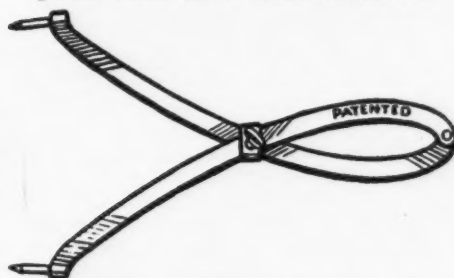
Cabinet is made of heavy gauge metal with easy grip handles on sides. Finish is black lacquer, chromium trimmed. Underwriter approved.

5—Quickest Divider

Reiner & Campbell, Inc., 242 Lafayette St., New York City, recently purchased patent and manufacturing rights of the new Quick-Set divider for pattern drafting and lay-out.

This divider can be set rapidly and is accurate. When the wing nut is tightened it is impossible for it to slip or spring.

The Quickset has hardened steel points which can be removed and re-



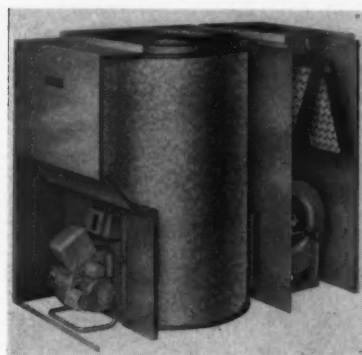
placed with pencil for drawing. No center punch is needed.

Divider is made in two sizes; 11 in. long for circles up to 36 in. and 14 in. long for circles up to 48 in.

6—Oil Economy 85

International Heater Company, Utica, N. Y., offers the Oil Economy "85" winter air conditioning unit for small homes in an enameled furniture steel jacket, fired by a pressure atomizing gun-type oil burner.

The unit automatically cleans the oil before it reaches the burner, cuts in the blower when the proper furnace



temperature is reached, filters, humidifies, and adjusts the chimney drafts, stops the burner when the furnace temperature gets too high, and shuts off the burner if electrical or burner failure occurs. A room thermostat controls the temperature.

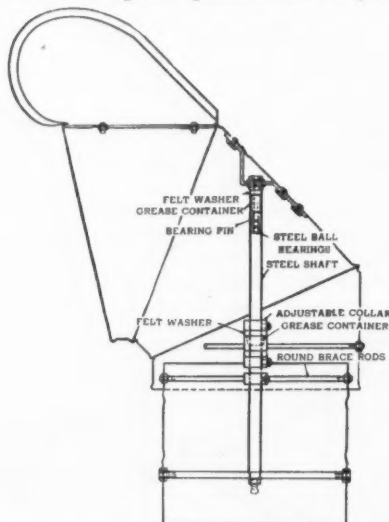
Capacity is 85,000 Btu at register.

New Products

For your convenience in obtaining information regarding these items, use coupon on page 98.

7—Nu-Alpina Ventilator

Milcor Steel Company, Milwaukee, Wisconsin, has recently redesigned the Milcor Nu-Alpina ventilator. The new Nu-Alpina operates on the air-

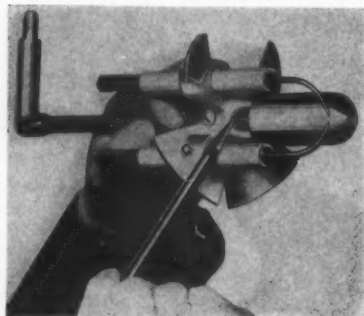


siphon principle, utilizing outside wind currents to draw impure air from building interiors. A wind vane at the top turns the revolving head so that the flue opening is always facing away from the wind, thus eliminating down drafts and creating a natural vacuum.

In the new design, the revolving head is suspended on a practically frictionless ball-bearing pivot. This makes the ventilator super-sensitive to changes in wind direction.

8—Water Heater

The Nu-Way Corporation, Rock Island, manufacturers of automatic oil burners, offers a low-cost automatic water heater with the Nu-Way shielded nozzle.



The nozzle permits the burning of only $\frac{3}{4}$ gallons of No. 3 fuel oil per hour.

The Nu-Way water heater is made in two models—Model H2-O without storage tank and Model H2-OT with a 25-gallon storage tank. Both are enclosed in attractive blue jackets.

9—Rocan Copper Sheets

Revere Copper and Brass Incorporated, 230 Park Avenue, New York City, announces Rocan, with high tensile strength and endurance limit in fatigue—a new product in the roofing and building fields, and selling at a premium of one cent a pound over standard rolled and strip copper.

Rocan is available in standard stock sizes in sheets, rolls and strips.

10—Blo-Ettes

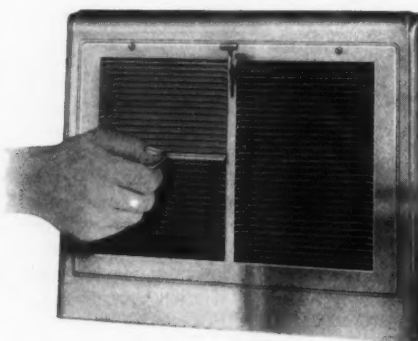
The Lau Blower Company, Dayton, Ohio, announces a new 400 Series Blo-Ettes—a low-priced unit completely packaged, assembled, and small enough to go through a house door.



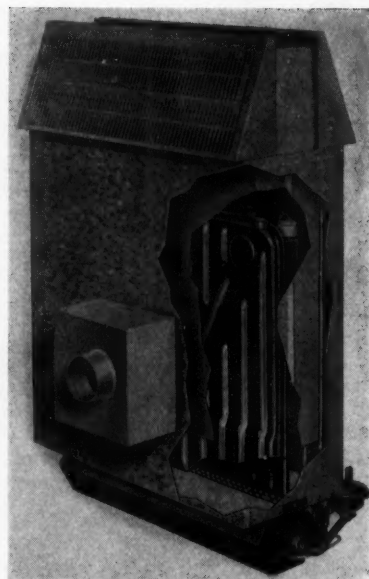
Large access door permits change of filters, and easy service in oiling the self-aligning bearing. The pulley belt may be easily changed through this access door. A large filter in leak-proof filter frame slides in and out like a drawer.

11—Baseboard Register

Hart & Cooley Manufacturing Co., Holland, Michigan, offers the No. 130 Series baseboard register with removable face for both gravity and



air conditioning installations. Flexible horizontal fins provide concealment of duct. Finish is a rich brown lacquer called Metalustre.



12—Dual Flor-Aire

The L. J. Mueller Furnace Company, Milwaukee, has recently announced the Flor-Aire floor furnace line—the Dual Flor-Aire furnace.

The Flor-Aire is a self-contained re-circulating type pipeless furnace, complete with dual register box and two wall grilles. The return air travels down into the furnace through the outer edge of the wall register, insulating the complete warm air stackhead—a protection against overheated walls.

The full length Bunsen-type Mueller burner occupies the entire space at the bottom of the heating section and uses air from beneath the floor.

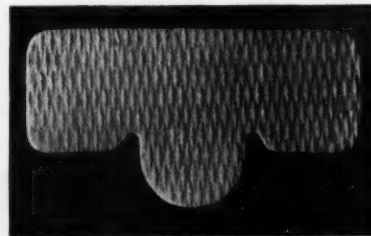
The heating section is of baffled, ribbed design. The unit is equipped with an adjustable damper which may be operated from either room.

Operating controls are readily accessible.

The unit is available in one size—an A. G. A. input rating of 33,000 Btu per hour, and an output rating of 23,100. Over-all height is 46 $\frac{1}{2}$ inches, and width, including diverter, is 17 $\frac{1}{2}$ inches.

13—Vapoglas

The J. L. Skuttle Co., 999 Franklin St., Detroit, announces Vapoglas after intensive research, all glass evaporating plates.



Vapoglas is made of pure glass by a special process (no bonding agent used), is light in weight, strong and has a high capillary action. Vapoglas is inert to boiling water and temperatures to 1000 deg. F.

New Products

For your convenience in obtaining information regarding these items, use coupon on page 98.

14—Limit Control

Sampsel Time Control, Inc., Spring Valley, Illinois, has designed a warm air furnace control—a three-in-one limit control with wiring combinations



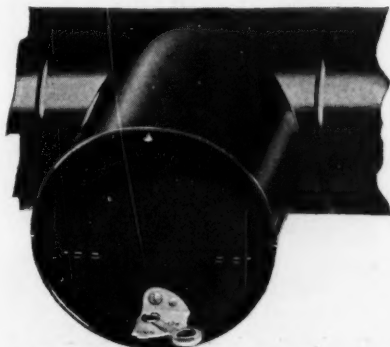
which adapt the control to low or line voltage limit control operation, or line voltage fan control operation. A patented switch provides positive snap action on make or break.

The control, in an enameled dust-proof case, is equipped with adjustable flange which enables it to rest in a vertical position, regardless of the angle of slope of furnace bonnet.

The new Sampsel control operates over a range of 100 to 500 deg. A simple adjustment makes it possible to change the differential to any setting from a minimum of 10 to a maximum of 90 deg.

15—Barometric Draft Control

Conco Engineering Works, Mendota, Illinois, announces a 6-in. Type "U" barometric draft control to be used in vertical, horizontal or slanting installations, for space heating control.



Like the Type "M" the 6-in. model is equipped with side wings formed as a part of the ring.

Easy adjustment is provided for low, medium and high draft settings, for control adjustable to the draft conditions encountered when space heaters are used.

16—Norwol Pipe Insulation

Norristown Magnesia & Asbestos Co., Norristown, Pa., offers Norwol, an insulation for copper tubing for hot or cold water work.

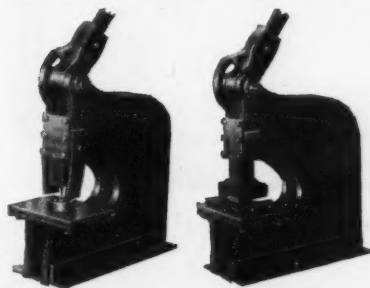
Norwol, a wool felt pipe insulation,

has a "wave structured" body providing minute dead air spaces. The finish is a crinkled jacket in aluminum, requiring no painting.

Norwol is made in standard 3-foot sections in all copper tubing sizes.

17—No. 42 Little Blacksmith

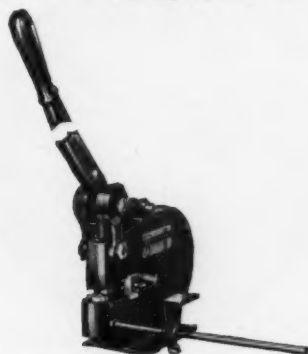
The J. F. Kidder Mfg. Co., Inc., 426 Colchester Ave., Burlington, Vermont, has recently bought out the No. 42 Little Blacksmith of steel plate arc welded construction. Weight is 300 pounds; depth of throat 7 in. Punching capacity is 2 in. hole in 1/8 in.



mild steel. The machine can be equipped with a number of attachments for different operations—punching holes up to 5 in. in diameter; angle iron shearing up to 2x2x 1/4 in.; angle iron notching up to 2x2x 1/4 in.; shearing flat stock up to 7x 3/8 in.; square notching up to 4x4 in. in 12 ga.; 90 degree notching up to 5x5 in. 1/8 in.; cutting large holes in material up to 1/4 in. thick.

18—Bench Punch

Whitney Metal Tool Company, 110 Forbes St., Rockford, Illinois, has developed a new No. 17 Bench Punch—a powerful, roller-bearing, deep throat punch made from fabricated steel plate and is equipped with a side

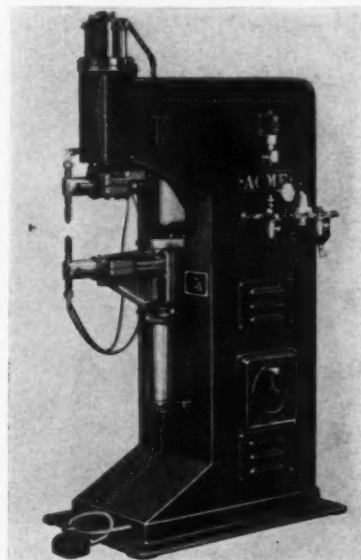


and depth gauge. Capacity is 1/4 in. through 1/4-in. iron, depth of throat 6 1/2 in., height of throat 1 1/2 in., weight 38 pounds.

The tool is furnished with three punches and dies—1/2, 3/4 and 1 1/2 in. Stock sizes are from 1/8 to 3/2 in. by 1/2 in.

19—Spot Welder Line

Acme Electric Welder Company, 5621 Pacific Blvd., Huntington Park, California, announces a complete line of direct action air operated press-type spot and projection welders, de-



scribed in their new Bulletin No. 53.

This line of air operated spot welders is manufactured in transformer capacities from 30 KVA to 150 KVA. In the smaller capacity welders throat depths are available from 12 to 30 in., and in the larger capacity welders from 12 to 48 in. Eight steps of heat regulation are standard but up to 32 steps can be supplied on special order.

The all-welded fabricated steel construction provides rigidity and sturdiness, and a modern and streamlined appearance.

Other standard features include watercooling of secondary, column and electrodes, universal double and reversible horns, positive locking type heat regulating switch, piston packed mirror ground air cylinder cushioned on both up and down stroke, and complete air equipment including filter.

20—Spray Booth Fan

DeBothezat Ventilating Equipment Division, American Machine and Metals, Inc., East Moline, Illinois, has placed on the market a new paint spray booth fan with guaranteed performance ratings. Being built to Underwriters' specifications, the fan is corrosion resisting and non-sparking. The motor is substantially mounted and perfectly balanced outside the fan housing on an adjustable base, and power is transmitted by "V" belts through a vapor-proof drive chamber. Fan wheels are of die-formed aluminum, and blades are easily removable for cleaning.

Correction

The Heil Co., Milwaukee, announces that its Model F-80G gas-fired Activ-Air conditioning unit is not AGA approved as erroneously reported in an earlier issue of this publication.

New Products

For your convenience in obtaining information regarding these items, use coupon on page 98.

△21—Dew-Aire Conditioning

The Standard Computing Scale Company of Detroit, announces the Air Conditioning and Refrigeration Division, headed by W. M. Stewart. The unit being manufactured is Dew-



Aire, a small, compact unit, in an attractive cabinet to heat in winter, deliver cold air in summer, as well as dehumidify, circulate and filter the air.

Dew-Aire is attached to steam or hot water heating systems—takes the place of radiators.

Dew-Aire develops up to 5 tons of refrigeration, or where tap water of 60 deg. F. or lower is available will develop 1½ to 2 tons of refrigeration.

Dew-Aire is styled in three moderne designs.

△22—Radiation Furnace

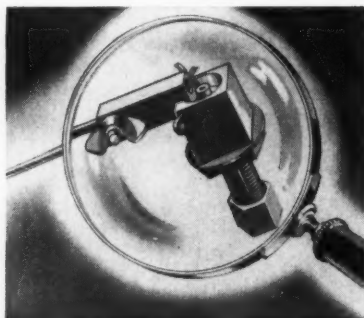
Michigan Fire-proof Skylight Company, Benton Harbor, Michigan, is now the Radiation Furnace Corporation, and has moved into larger quarters and is preparing to manufacture the Radiation furnace on a production



basis. Illustrated is the furnace radiator, the small size of which has 8 heat transmitting walls; the next size 16 heat transmitting walls, and the large size 24 heat transmitting walls. The furnace is oil-fired, forced warm air type, fully automatic, and is enclosed in a square cabinet in Hammer-kraft finish—either blue or black.

△23—Emdee Humidifier

Mechanical Devices, Inc., Union Commerce Building, Cleveland, is introducing the Emdee line of automatic water tenders. The Emdee complete humidifier unit (Type B or C) is controlled by the Emdee valve and Roberts Better-Built float. Water is taken from the supply line by means of the Kwik-AcT saddle valve, after

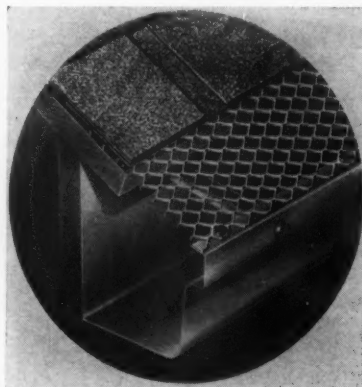


which the valve and float maintains the set water level. Evaporator plates are of fireproof, absorbent material. The pan is of welded 16-gauge steel, coated with 2 coats of acid-resisting porcelain enamel.

Type B Evaporating pan is 8 in. wide, with an average effective length of 32 in. Type C humidifier is regularly made in lengths of 20, 30 and 40 in., 4 inches wide by 3 in. deep. Equipped with Universal frame, supporting rod and enameled steel adjustable bridge. A combined brass shield and steel cover plate also is included.

24—Roof Gutter Protection

The Eav-Tex Company, 1109 Garfield Ave., Upper Darby, Pa., offers Eav-Tex, an expanded metal in solid



copper, lead coated copper and heavy galvanized steel, for roof gutter protection.

Eav-Tex is rigid with diamond-shaped openings. Fasteners are made in styles and materials for every type roof gutter.



25—Baby B Blower-Filter

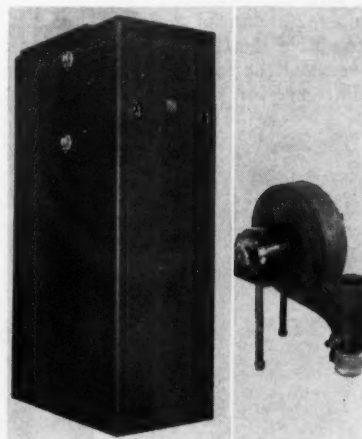
Brundage Company, Kalamazoo, Mich., announces a new blower-filter tradenamed the "Baby B"—designed especially for the low-cost home.

Outside dimensions are 31 in. high, 21¼ in. wide, and 24½ in. deep. The cabinet is made of heavy body stock with "Hammer-Finish" baked enamel. Filters of 2-in. thickness provide 500 sq. in. of filter area. Regular De Luxe Brundage blower assembly with motor and drive is used.

26—Gas-Vac Air Conditioner

The Vacuum Gas Appliance Division, Union Fork and Hoe Company, Rome, N. Y., announces the Gas-Vac winter air conditioning unit in three capacities—47,500, 76,900 and 104,500 Btu at the bonnet.

Equipment includes approved safety pilot, room thermostat, limit and fan control, Minneapolis-Honeywell valve and vacuum safety valve.



Combustion is supported by a small vacuum exhaustor which maintains a partial vacuum on the unit, drawing air for combustion into the burners, premixed with the gas. A flame temperature of well over 2,000 degree is obtained, and this is carried through baffled cast iron heat exchangers.

The products of combustion are cooled to the point of condensation, and flue temperatures run as low as 160 deg.

Gas-Vac is built in two styles—the Imperial which houses the exhaustor and the Master which has the exhaustor installed outside the jacket.

YOUR 1941 EXTRA PROFIT MAKER!



RESEARCH AIR FILTER

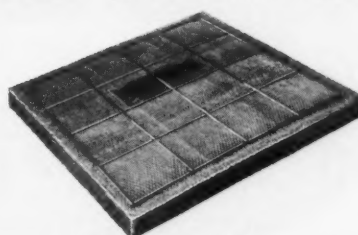
HAVE YOU SEEN THE
NEW "200" SERIES

THE EASY SERVICE
SELF-SEAL RE-FIL-ABLE FILTER
with **HOOKED** wire grids

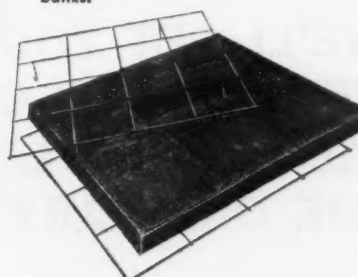
Designed for easy, inexpensive replacement service this RESEARCH Re-Fil-Able Filter has a pad sandwiched between two wire grids which hook together. The pad is fashioned to extend snugly to the sides of the confining air passageway, thus sealing against air leaks. When the filter pad becomes filled with dirt, the grids are removed and unhooked, a new pad inserted, and the renewed unit is ready to use. It's tops for easy replacement service, repeat business, and EXTRA PROFITS!



Write for Data Sheets on the
complete **RESEARCH** Filter line.



Used in warm air furnaces, air conditioning units and filter banks.



Showing filter pad and HOOKED wire grids disassembled.

RESEARCH PRODUCTS CORP., MADISON, WIS.

H&C DAMPER REGULATOR SETS



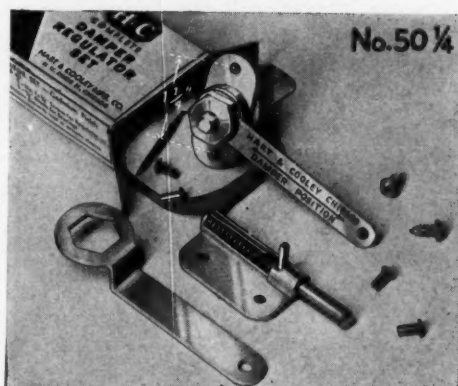
(No. 40 1/4 S Set
with snap bearing is now furnished for No. 40 1/4 Set at 30c List Price)

ECONOMY TYPE—Quality at a Price!
Furnished with both wing and hexagonal lock nuts. Made only with 1/4" Bearings. No. 40 1/4 S—List Price 30c Set.

Pick the Type that Suits you Best!

H&C offers three different sets in the 1/4" size, all furnished with snap end bearing to permit the installation of even the smallest dampers without bending. All are quality sets in every detail with all parts rust-proofed; all are equally adaptable to splitter or regular dampers. See your Jobber or write for sample and descriptive literature.

HART & COOLEY MANUFACTURING CO.
HOLLAND, MICHIGAN - - Chicago Office at 61 W. Kinzie Street

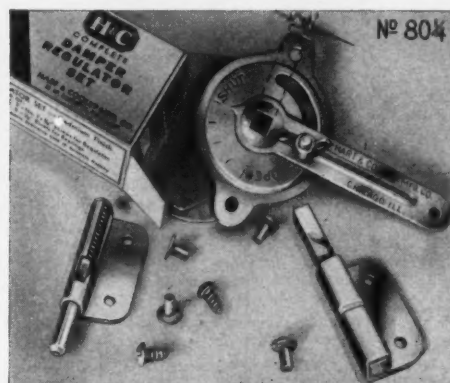


BRACKET TYPE (left)

With 1/4" Bearings. No. 50 1/4—List Price 40c Set. With 3/8" Bearings. No. 50 1/2—List Price 60c Set. 1/4" size has snap end bearing.

DISK TYPE (right)

With 1/4" Bearings. No. 80 1/4—List Price 40c Set. With 3/8" Bearings. No. 80 1/2—List Price 60c Set. 1/4" size has snap end bearing.



FREE! VAPOGLAS
 PATENTS PENDING

SEND FOR SAMPLE TODAY



WE'LL LET YOU BE THE JUDGE!
HERE'S YOUR CHANCE TO FIND OUT IF SKUTTLE'S
All Glass **PLATES ARE MORE EFFICIENT THAN**
THE ORDINARY EVAPORATING PLATES.



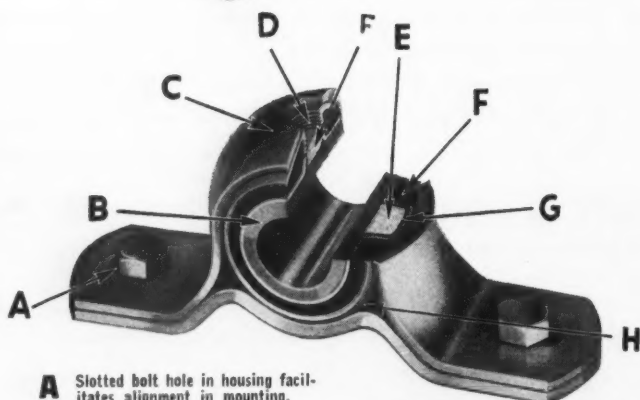
SKUTTLE Sales COMPANY
Air-Conditioning Equipment

999 FRANKLIN ST.

DETROIT, MICHIGAN

TRIANGLE Shock Absorbing PILLOW BLOCK

PATENTED



A Slotted bolt hole in housing facilitates alignment in mounting.

B Porous bronze bushing feeds lubricant from wick to shaft as needed. Easily replaceable.

C Pressed steel spherical housing encloses steel ball (H) insuring perfect alignment through ball and socket action.

D Threaded opening for oil cup or fitting, leading to oil reservoir.

E Felt wick stores oil for long periods of operation.

F Thick synthetic rubber cushion supplies a vibration-absorbing element between bearing and housing. Impervious to oil or hardening action.

G Steel retainer sleeve which holds bushing, cushion and wick in proper relation.

H Pressed steel ball formed around inner assembly holds parts rigidly in position and makes an oil tight seal.

Write for new bulletin containing all details of construction, sizes, etc. Quotations submitted on request.

TRIANGLE MFG. CO., 380 DIVISION ST., OSHKOSH, WIS.

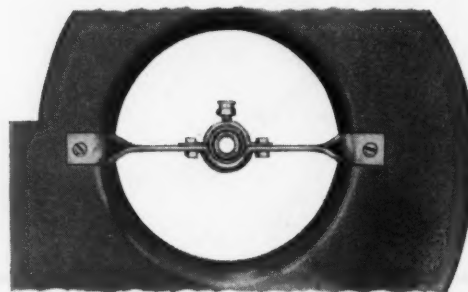
At last here's a trouble-free bearing for fans, blowers and any other service where silent operation—perfect alignment—and self-lubrication are important considerations.

Cut-away view at the left illustrates how unique engineering has created a design outstandingly different from the conventional.

Besides the obvious advantages of this rigid, CUSHIONED, BALL AND SOCKET BEARING, its compact air-streamed design is of real importance in blower service. It presents the very minimum of air restriction!

Another Triangle innovation is the Bridge Tree Mounting illustrated below. Again we have a minimum obstruction to air flow with maximum simplicity and strength.

Bridge Tree Mounting to Blowers



New Literature

For your convenience in obtaining copies of new Literature use the coupon on page 98.

101—Anchor Aire Winter A. C. Unit

Anchor Stove & Range Co., New Albany, Ind., is distributing a 6-page folder, covering the Anchor-Aire complete winter air conditioning unit, the heart of which is the Anchor Kolstoker stoker firing unit.

102—Streamlined G-E Motors

General Electric Company, Schenectady, N. Y., is distributing Publication GEA-3437 covering Streamline G-E motor for domestic oil burners designed to harmonize with the appearance of the oil burner, and for greater ease in mounting and installation.

103—Residential Registers

Register & Grille Manufacturing Co., Inc., 70 Berry St., Brooklyn, N. Y., is distributing a 4-page folder illustrating and describing the "Thin Man" registers for residential purposes, with details of the shutter and face.

104—Revere Award of \$10,000

Revere Copper and Brass Incorporated, 230 Park Avenue, New York City, is offering nine cash prizes totalling \$10,000 for suggestions, submitted by American workmen in the metal industry, that will do most to accelerate our country's industrial defense program. A booklet with detailed information is available.

105—Furnace Repairs

Banner Repair Parts Co., 103 East Indianola Avenue, Youngstown, Ohio, is distributing Catalogue No. 7 entitled "Furnace Repairs." There are 144 pages and cover (7 $\frac{1}{4}$ x 10 $\frac{1}{2}$ in.) with instructions for ordering repairs, and terms. Furnaces are listed by trade name, furnace number, maker, and prices are given for each repair.

106—Gas Fired Furnaces

Payne Furnace & Supply Company, 336 North Foothill Road, Beverly Hills, California, is distributing Catalog No. 40 covering Payneheat gas-fired furnaces, Modernair blower unit, duct furnace, Zoneair unit, closet type furnace, Spacesaver unit, floor furnace, suspended furnace, register furnace, console heater, gas vent and flue pipe, period design registers.

107—General Catalog

Beck Engineering Combustion Kompany, St. Louis, has compiled a general catalog, made up of the various bulletins published covering the Silentblu heat machine—a gas burning device for furnaces; Daptoblu conversion burner; Ovaltube gas burners; Silentblue blowers; Thermogas gas-fired furnaces and air conditioners; Thermoil oil-fired furnaces and air conditioners; Thermalfuel coal-fired furnace and air conditioner; the Beck interchangeable Thermalfuel air conditioning machine for gas, coal or oil; Thermalfuel heavy duty furnaces and air conditioners for factories, warehouses, schools and churches; and the Beck stoker.

108—Short Method of Pattern Development

The American Rolling Mill Co., Middletown, Ohio, is offering a "Short Method of Pattern Development," prepared by Ralph W. Poe, sheet metal contractor of Canton, Illinois. This 48-page booklet explains in simple shop language an improved short cut to pattern drafting. Published first as a serial in Ingot Iron Shop News, the series covers such sheet metal transition problems as: Square to round; oval to round; rectangular to round; square to round elbows; "Y" joints; oval to round elbows; tee joints; off-center tees; and angular intersections.

Copies are available from the Sheet Metal Shop Service Department—price 30 cents in stamps or coin covering printing and mailing costs.



Then here's an easy one that means money in your pocket when you answer it!

Question . . .

What very inexpensive Air Conditioning register has instantly adjustable face blades?

Question . . .

What very inexpensive Air Conditioning register is made both in the conventional single valve type and in the adjustiblade — multi-shutter type?

Question . . .

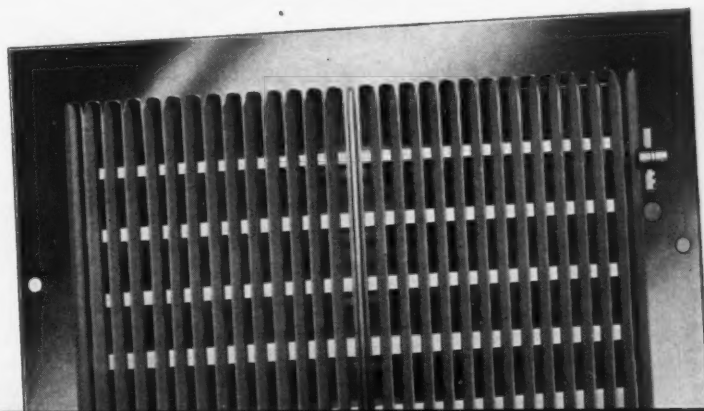
What quality built Air Conditioning register is inexpensive enough to make it fully competitive on big housing projects?

Question . . .

What scientifically designed Air Conditioning register can be made to deflect the air path up or down, right or left?

Question . . .

What inexpensive Air Conditioning register has just now become even less expensive due to the very large quantities manufactured?

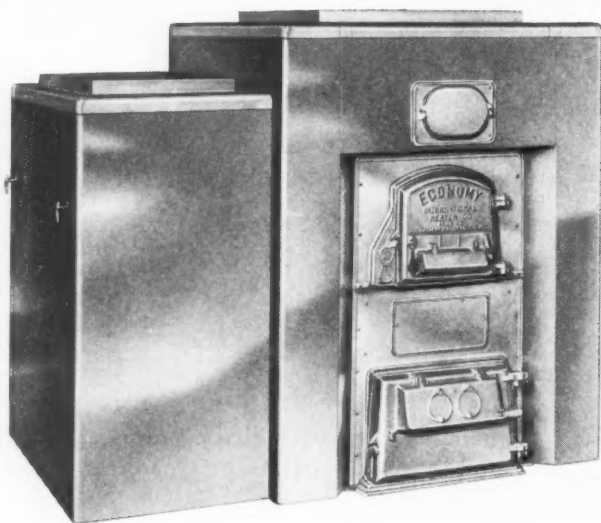


THE ANSWER IS THE
PLIAVANE
REGISTER



Send for new catalog No. 41 R
just off the press.

TUTTLE & BAILEY, Inc.
NEW BRITAIN, CONN.
NEW YORK CHICAGO PHILADELPHIA



ECONOMY JACKETED AIR CONDITIONING UNIT

New beauty — new economy — new comfort in the Economy Jacketed Air Conditioning Unit. Made by specialists in heating equipment for over 100 years. Central heating unit tried and proven over a period of years and protected by our Ten Year Maintenance Agreement. Rated according to national code. Quiet, powerful blower. Available in round or square case. Variety of humidifiers and controls to choose from. While designed primarily for solid fuel, can be easily adjusted to the use of oil and stoker. Jacket design is such that blower may be installed on either side or the back—which-ever is better for your installation.

Send for literature on the Economy Jacketed Air Conditioning Unit and other proven International Products.

INTERNATIONAL
HEATER COMPANY
UTICA, N. Y., U.S.A.

WESTERN OFFICE AND WAREHOUSE • 1933 WENTWORTH AVE., CHICAGO, ILL.
NEW ENGLAND OFFICE AND WAREHOUSE • 110 CHESTNUT ST., NASHUA, N. H.
STOCKS CARRIED WITH WHOLESALERS IN ALL PRINCIPAL CITIES

New Literature

For your convenience in obtaining copies of new Literature use the coupon on this page.

109—Registers, Faces, Grilles

The Independent Register Co., 3747 East 93rd Street, Cleveland, offers Catalog No. 41G—January, 1941—covering warm air registers, cold air faces, grilles, and adjustable ceiling ventilators.

110—Excelsior Manual and Code

The Excelsior Steel Furnace Co., 118 S. Clinton St., Chicago, is offering a new manual covering Excelsior forced air ducts and fittings, with which is incorporated the Excelsior code.

111—Furnace No Better Than Humidifier

McDonnell & Miller, Wrigley Building, Chicago, is distributing an envelope stuffer entitled "Your Furnace Is No Better Than Its Humidifier!" The humidifier and its relation to the fuel bill are discussed.

112—Presses, Punches and Shears

Niagara Machine & Tool Works, 637 Northland Ave., Buffalo, is distributing Booklet No. 106-A—a condensed resumé of the Niagara line for shearing, blanking, drawing and forming of plate and sheet metal.

113—KoolShade Sun Screens

Ingersoll Steel & Disc Division, Borg-Warner Corporation, 310 South Michigan Ave., Chicago, is distributing a 12-page booklet showing representative installations of KoolShade sun screens. Letters telling how KoolShade performs in actual service occupy two pages.

114—Capacitor Single Phase Motors

Century Electric Company, 1806 Pine Street, St. Louis, is distributing a 4-page folder covering Century Capacitor Single Phase Motors up to 20 Horsepower. Torque, multi-speed, insulation, lubrication and overload protection are discussed.

115—Protection Against Termites

Copper & Brass Research Association, 420 Lexington Avenue, New York City, offers the second edition of "Protection Against Termites with Copper Shields." This is a revision of the first edition of this book and copies are available without cost, by writing the association.

116—Defeat Desert Dryness

Maid-O'-Mist, Inc., 215 N. Aberdeen St., Chicago, is distributing an 8-page envelope stuffer entitled "Defeat Desert Dryness in Your Home and Office." Humidification is discussed and the Convector humidifier for warm air furnaces is pictured and described, as well as the radiator types.

FOR YOUR CONVENIENCE

American Artisan, 6 N. Michigan Ave.
Chicago, Ill.

Please ask the manufacturer to send me more information about the equipment mentioned under the following reference numbers in "New Products" and "New Literature." (Circle numbers in which you are interested):

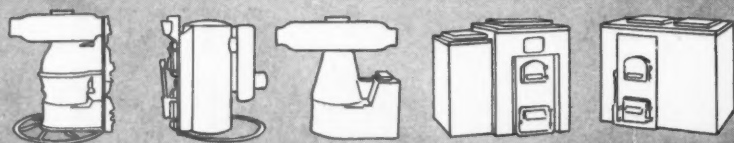
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8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26		
101	102	103	104	105	106	107
108	109	110	111	112	113	114
115	116					

Name

Company

Address

Are you Manufacturer—Jobber—Dealer—



Tests
that assure the
dependable, trouble-
free performance of
CURTIS
Condensing
Units



Selecting
pins, using
the Sheffield
Visual Gauge.

Selective
Piston Pin Fitting

Piston pins for CURTIS condensing units are checked for size, taper and out-of-round to .0001" by means of a Sheffield Visual Gauge and are matched with piston pin holes gauged and segregated according to the same tolerances. The Sheffield Visual Gauge measures to within 1/2 of one ten thousandths of an inch (.00005) and is set by Johansson Master Blocks.

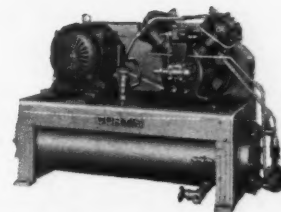
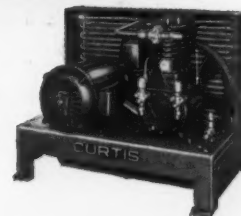
Matching both pins and pistons according to such fine tolerances assures the closest, most accurate fitting. The result is less wear, less vibration, quieter operation and materially longer life.

This is only one of the many examples of the care and precision of Curtis manufacturing methods. All contribute to the long life, high efficiency and trouble-free performance of every Curtis Condensing Unit.

Curtis Refrigerating Machine Company
1946 Kienlen Avenue, St. Louis, Missouri



Division of Curtis Manufacturing Company



45 Air-Cooled Units—42
Water-Cooled Units—1/6
to 30 h. p.

KLAUER

*Profit
Tips*



**SPEED WORK!
SAVE TIME!
SATISFY CUSTOMERS!
BOOST SALES!
CUT COSTS!
MAKE MONEY!**



**ONLY ONE-PIECE CUT-OFF
ON THE MARKET!**

High collar interlapped or seamed into position. Heavy, rugged cut-off lever and valve held in position by sturdy spring. Ample spacing of branches for convenience in soldering. All connections interlocked—hot galvanized after assembly. Made in round corrugated, plain round or square corrugated.

**FREE! NEW POCKET-SIZE
CATALOG & PRICES**

Never sold to chain stores or catalog houses—with dozens of exclusive features to give you a selling "edge" . . . located in the heart of the country for quick delivery and cheaper freight rates . . . priced competitively . . . Klauer products are real money-makers for independent dealers. Send today for latest catalog and price list!



CONDUCTOR HOOKS

All-steel, hot galvanized finish—can be driven into any type wall without breaking or bending. Four styles—for wood, brick or stone walls.



CONDUCTOR FASTENERS

Plain or corrugated, copper or galvanized, round or square, for wood or brick. Made to offset pipe one inch from building.



Klauer SINCE 1870

MANUFACTURING CO., DUBUQUE, IOWA



- Roofs and Box Gutters, Valleys, Flashing
- Sheet Steel, Corrugated Sheets
- Skylights, Stock Tanks

- Ventilators and Cupolas
- Eaves Trough, Conductor Pipe and Trimmings

- Metal Ceiling, Pressed Siding, Rolled Roofing
- Metal Lath and Corners
- Ridging, Corners, Battens, Shingles

KNOW AIR CONDITIONING



Send Today
for
Samuel R. Lewis'

"AIR CONDITIONING FOR COMFORT"

Third Edition
288 Pages—Illustrated
\$2.50

Here is a book that presents—in simple, readily understandable form—every kind of information necessary for an accurate and thorough knowledge of air conditioning principles, equipment, and practices. Written by S. R. Lewis, a widely-known consulting engineer who has been active in air conditioning work for more than thirty years, it deals with all angles of the air conditioning subject from the practicing engineer's viewpoint. The designing procedures explained in the book are, for example, in every detail the same procedures employed today by the author's own organization.

Featuring this third edition are several entirely new chapters on phases of the subject not previously treated, including noise control, air conditioning measurements, air conditioning standards, fire protection codes and operating suggestions. Brand new designing examples are also used, together with new forms for recording the design data, the proper filling-in of which is explained step-by-step.

OF VALUE BOTH AS A REFERENCE AND TEXT

Engineers in air conditioning will find the new "Air Conditioning for Comfort" invaluable as a reference book, while salesmen, students, and others may rely on it to give them a clear knowledge of fundamentals, and of the latest air conditioning methods and equipment.

Send for a copy today. We know you will consider this volume the most readable and complete book on the air conditioning science you have yet seen. You will risk nothing in ordering a copy, for you will be privileged to return it for a refund if for any reason it should prove unsatisfactory. Order your copy now.

KEENEY PUBLISHING COMPANY
6 N. Michigan Ave. Chicago, Ill.

With the Manufacturers . .

New Chelsea Plant

Chelsea Fan & Blower Co., Inc., formerly of New York City, is in their new home since February 1, at Olsen & Grove St., Irvington, N. J.

The new Chelsea plant, made necessary by expansion, is modern and covers an area with room for further expansion. The building has a 30-foot, 3-ton traveling crane covering the entire 150 feet of the assembly floor which is roofed by a monitor constructed of solid glass.

Norge Appointments Foreshadow Expansion

Realignment of executive personnel in the Norge Heating & Conditioning Division of Borg-Warner Corporation became effective January 1 this year under an order from Howard E. Blood, president, Norge Division. Heading the list of appointments were those of S. J. McCarthy, sales manager, and C. S. Davis, Jr., secretary-treasurer.



S. J. McCarthy
(Above)
C. S. Davis, Jr.



Other appointments are: George Neumann, in charge of engineering; G. M. Johnston, in charge of service and sales engineering; E. R. Nichols, central divisional sales representative with headquarters at Detroit; H. W. Winningham, western divisional sales representative with headquarters at Seattle, Washington; L. J. Amish, northeastern divisional sales representative with headquarters at Rochester, New York; H. C. Altenberg, mideastern divisional sales representative with headquarters at Upper Darby, Penna.

The new plan of organization is understood to be a basic step in a long-range program to expand and diversify.

J. M. & L. A. Osborn House Warming

The J. M. & L. A. Osborn Company, Cleveland, jobbers of sheet metal, roofing and warm air heating products, held a "house warming" party Saturday, January 18, with more than 1200 sheet metal dealers, suppliers, their employees and wives. The occasion marked the formal opening of the company's new general offices.



The program began with afternoon trips through the new offices, warehouse and manufacturing department. In the early evening a buffet supper was served, followed by dancing and music.

The J. M. & L. A. Osborn Company is the outgrowth of a stove and range manufacturing and jobbing business started in Cleveland in 1859 under the name of Myers and Osborn.

In addition to adding the general offices and display room for the use of its dealers in Cleveland, Osborn, during 1940, also added a Cincinnati warehouse, doubled the space of its Buffalo division and purchased the business of the Globe Ventilator Company of Troy, N. Y.



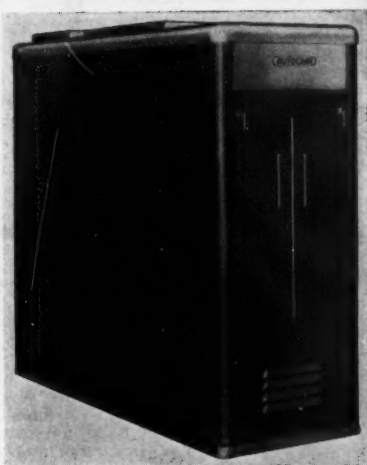
Niagara 18 Gage Foot Operated Shears with 96 inch and 120 inch cutting lengths are ideal for sheet metal shops and maintenance departments requiring long sheets, such as used in ventilating, heating, air conditioning and roofing work. Easy foot operation is the result of the design of every working part. Treadle extends the full length of the shear and is accessible at any location when cutting large sheets. Holddown is operated by self-locking eccentrics, thus enabling operator to let go of holddown handles while pressing the treadle. Ball-bearing, self-measuring, parallel back gage is standard equipment. Write for Bulletin 80-D. Niagara Machine & Tool Works, 637-697 Northland Ave., Buffalo, N. Y. Branches: Cleveland, Detroit, New York.

For Alert Dealers -

✓ Bigger Profits
✓ Faster Sales
✓ Customer Satisfaction



- AUTOCRAT Oil Heat



A complete line of pressure and vaporizing Conversion burners and furnace units for homes in every income bracket.



LET Autocrat help make 1941 a year of *consistent* profit for you. Everything is in your favor; building is booming . . . homeowners are sold on the advantages of oil heat . . . and Autocrat gives you prices which enable you to *compete and still make money*. Autocrat is trouble-free, safe, dependable, economical and

easy to install. Volume production and complete manufacturing facilities enable us to maintain famous Autocrat quality at low cost.

Hundreds of successful Autocrat dealers, large and small, recommend this line to you. Don't sacrifice quality for price. Stop pouring profits back into high servicing costs. Make Autocrat *your* line and build prestige along with volume and profits.

A Distributorship May Be Open in Your Territory . . . Write or Wire Today for Full Details.

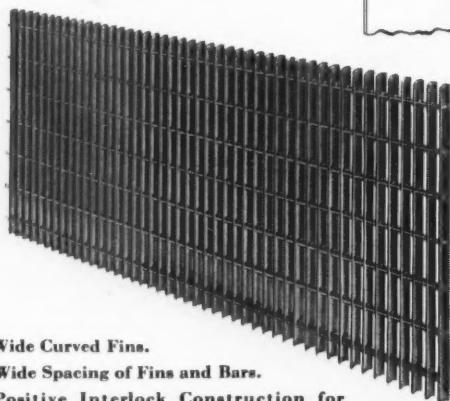
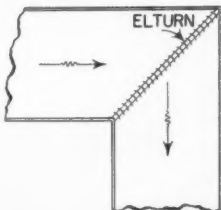
CHANDLER COMPANY CEDAR RAPIDS, IOWA

TWO NEW UNITS

For Elbows and Trunk Ducts

BARBER-COLMAN ELTURN

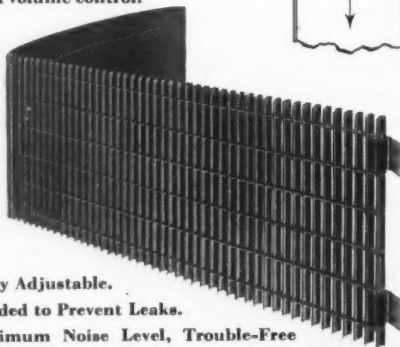
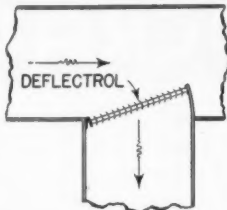
For use, as shown, in square-cornered duct elbows. A new, specially-designed, curved fin construction provides uniform, low-resistance air flow around the turn. Reduces duct space and improves appearance, as well as simplifying construction.



- Wide Curved Fins.
- Wide Spacing of Fins and Bars.
- Positive Interlock Construction for Long Life.

BARBER-COLMAN DEFLECTROL

For use, as shown, to control the flow of air into a branch duct. Distinctive curved-fin construction insures smooth, low-resistance air flow and prevents piling-up or distortion of air stream. Accurately adjustable for desired volume control.



- Fully Adjustable.
- Hooded to Prevent Leaks.
- Minimum Noise Level, Trouble-Free Performance.

WRITE FOR NEW UNI-FLO CATALOG

BARBER-COLMAN COMPANY

1226 ROCK ST., ROCKFORD, ILLINOIS

With the Manufacturers . . .

Spray Paint Training School

The DeVilbiss Company, 300 Phillips Ave., Toledo, Ohio, manufacturer of spray painting equipment, has announced the schedule of its training school for spray painting equipment users for the first six months of 1941.

These training periods, open to all interested in learning the technique of spray painting will be held at the company's Toledo plant February 17, March 17, April 21, May 19, and June 23.

Famous Furnace Banquet

The annual banquet of The Famous Furnace Co., of Cleveland, manufacturers and jobbers of sheet metal, furnaces and roofing supplies, was held Saturday, December 14, 1940, at the Hotel Hollenden.



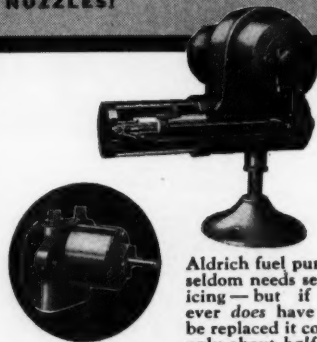
For the third consecutive year, bonuses were distributed to the employees, by Hyman Blaushild, president.

The employees in turn, presented Mr. Blaushild, with a liquor bar, in appreciation for his good fellowship.

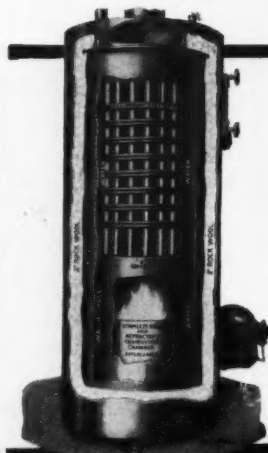
ALDRICH ELIMINATES FUEL UNITS

NO MORE CLOGGED NOZZLES!

• Aldrich leads again! Fuel units are eliminated — and with them most of the expensive field service work that cuts your profit. Aldrich uses a simple pump and valve arrangement — valve in the nozzle where it should be. It's a better fuel system. Makes possible our exclusive "liquid cooled" nozzle — eliminates carbon formation in nozzles. Get complete facts!



Aldrich fuel pump seldom needs servicing — but if it ever does have to be replaced it costs only about half as much.



HEAT-PAK BOILER...

Opens the profitable home heating market to you!

• Standardization and volume production have produced this long-lived, remarkably efficient, high-quality HEAT-PAK Boiler for steam or hot water. You can sell it profitably at a price that's competitive with warm air heating! Comes complete with burner, combustion chamber and controls. Tankless type coil for year 'round domestic hot water. Get all the facts on the Aldrich complete line of burners and oil-fired boilers and water heaters NOW.

ALDRICH COMPANY • WYOMING, ILL.

Claude M. Coffee

Claude M. Coffee, who for the past twelve years has been a salesman for The J. M. & L. A. Osborn Company of Cleveland, died suddenly Christmas morning at his home in Fort Wayne, Indiana.

Mr. Coffee, although only forty-eight years old, was widely known to the sheet metal trade in Indiana. His untimely death is felt keenly by his associates and many friends in the industry.

Vorys Conducts Dealer School

Vorys Brothers, Inc., distributors of sheet metal, tinners and roofers supplies, located at 79 East Goodale Street, Columbus, Ohio, put on a dealers' school January 22 and 23—an engineering school for the information of their customers without regard to equipment they handled. No mention was made of the particular brand of any type of equipment. The idea was to improve the engineering knowledge of the trade regarding forced warm air heating and to bring to the attention of the dealers all the new ideas in forced warm air heating. Newt T. Hess, one of the Vorys salesmen, was the instructor.

A special short code was the basis for the engineering work done at the school. The school somewhat followed the pattern of the Michigan Short Course in that the entire group was held together while the meeting was in progress. The school continued with just enough time out to eat. Considerable discussion was encouraged on standardization of furnace fittings and registers, and standardized engineering of the average house job.

Speakers included George Boeddener, managing director of the National Warm Air Heating and Air Conditioning Association on "Heating Codes"; S. Konzo, Professor at the University of Illinois, "Heating Problems"; Wesley R. Moore of Minneapolis-Honeywell on "ABC of Controls"; W. S. Somers, chief engineer of Lamneck Products on "Duct Design"; and C. J. Pearson of the United States Register Company on "Register Standardization." The Mueller movie "Manufacturing Furnaces" was shown.

PERFORATED METALS

Every Sheet Metal Worker needs perforated metal in one form or another.

For processing food products and to withstand certain chemicals, perforated Stainless Steel and Monel Metal are much used.

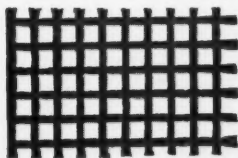
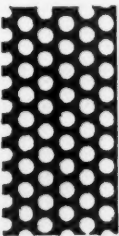
Factory Safety Guards—For this service perforated metal has no equal.

For Grilles, Radiator Enclosures, Air Conditioning Cabinets, we have many beautiful designs.

Write today for information and prices.

You'll like H&K prompt, satisfying work and pleasing prices.

Perforators of metals since 1883. Send us your specifications.



The **Harrington & King**
PERFORATING CO.

5649 Fillmore St., Chicago, Ill. New York Office, 114 Liberty St.

DOLLARS OR DIMES... WHAT DO YOU WANT?

Cole's Gas Fired Floor Furnaces Are the Quick-Selling Answer to Scores of Heating Questions

Selling Cole's Gas Fired Floor Furnaces pays big dividends in dollars and in customer satisfaction. In new homes for the finest in low cost automatic heat, sell Cole... for old homes, replacement jobs or for auxiliary equipment, sell Cole. NOW is the time to talk Cole's Gas Fired Floor Furnaces and NOW is the time for you to cash in on the demand for economical, trouble-free, dependable heat.



Cole Gas Fired Floor Furnaces are approved by the AGA. A full vitreous porcelain enamel inner heating unit assures the most in durability and efficiency.

Other features include large heating surface and long delayed flue travel for maximum heat from any gas; unit crimped and sealed by a patented process for gas tight and stay tight construction; three walled casing

ing of galvanized steel or full porcelain casing at small extra cost.

Combination safety pilot and automatic thermostatic control also available.

Write for full details today!



COLE HOT BLAST MFG. CO.
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**NOW WE MAKE
MONEY ON THE
16 GA. JOBS!**



IF fast cutting on the heavier sheets - up to 16 gauge hot rolled steel - has been a problem in your shop, you need a No 16 Unishear. It cuts as fast as you feed, follows any line, leaves clean, smooth edges without distortion of the metal.

No. 16 Unishear has plenty of power and ruggedness for any production work. Duplex Handle, with two grips, makes it easy to use in any position. Just plug it in and go to work. Ask your Stanley distributor for a demonstration on the Unishear that fits your work, or write for literature. Stanley Electric Tool Division, The Stanley Works, 122 Elm Street, New Britain, Connecticut.



"Mighty Midget"
Unishear Capacity
18 ga. hot rolled
steel. Only \$54.00.



No. 144A Unishear,
Capacity 12 ga.
hot rolled steel.



Stationary Uni-
shears with capac-
ity up to 1/4" boiler
plate.

STANLEY UNISHEARS

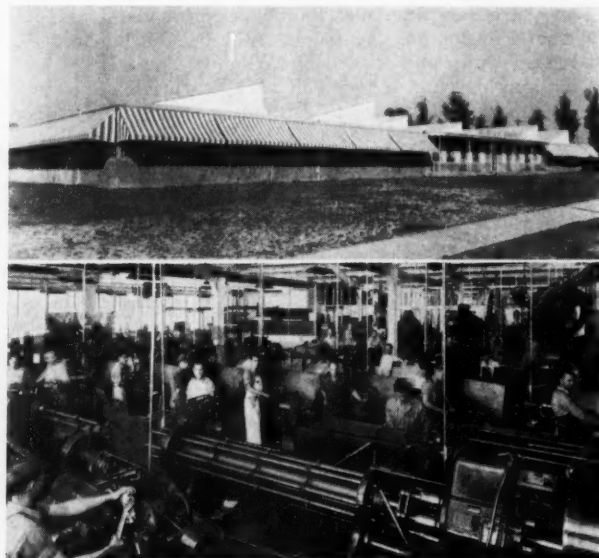
THE ELECTRICALLY DRIVEN HAND SHEARS

With the Manufacturers . . .

General Controls in New Home

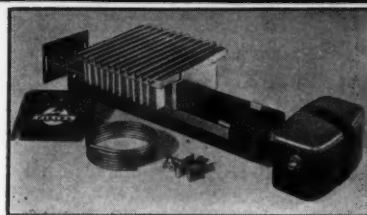
General Controls has recently removed its offices to a new main office and factory, covering eleven acres, located at 801 Allen Avenue in Glendale, California.

The equipment in the new plant consists of fast precision screw machines, lathes, sanding machines, multiple



drill presses, punch presses, complete tool making department; testing and research laboratory, millographs, temperature recording equipment, refrigeration plant and calorimeter and heating equipment.

VIKING HUMIDIFIERS



**ALL IN
FAVOR
SAY "AYE"**

Manufacturers, jobbers, dealers and consumers who have seen and used them say "Aye" in favor of VIKING Humidifiers when a vote is taken on their quality and trouble-free dependability.

VIKING Humidifiers assure correct humidification for the requirements of forced air and gravity systems.

Special VIKING features include the new streamlined Plastic Float Tank, which cannot rust nor corrode, the non-breakable "Cello-Sponge" Evaporators which have an exceptionally high absorbing and evaporating rate, and the trouble-free automatic Top-Seat Float Valve, easy to clean and adjust.

Write for the whole story

VIKING AIR CONDITIONING CORP.
9500 Richmond Ave. Cleveland, Ohio



Since its inception, General Controls has been guided by W. R. Ray, vice president, and his two sons, William A. Ray, president in charge of engineering, and Alvin W. Ray, vice president and general manager in charge of production.

Milcor Promotes C. G. Wollaeger

Announcement is made by Earl A. Tanner, president of the Milcor Steel Company, of the appointment of C. G. Wollaeger to the position of assistant general sales manager.

Mr. Wollaeger has been assistant manager of the Milcor fireproof and specialties division since 1934, devoting himself largely to the development of the metal trim line. He has been with Milcor for fourteen years.

W. G. Baum, who has been handling fireproof sales for Milcor in the Chicago area, will take Mr. Wollaeger's place in the fireproof and specialties division.

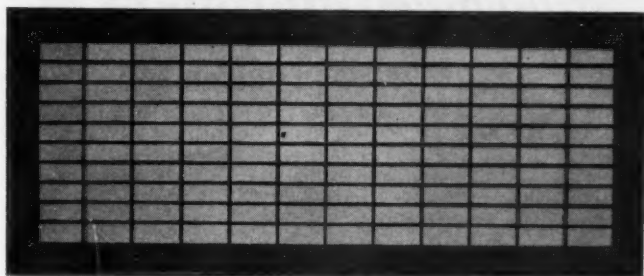
Milcor's Springfield, Illinois, salesman, Paul Dunn, will be transferred to Chicago, where he will take over the fireproof sales work formerly handled by W. G. Baum.

Robinson Retires from Active Business

On January 1, 1941, James H. Robinson, connected with The Hart & Cooley Manufacturing Company of New Britain, Connecticut, and Holland, Michigan, since 1901 decided to retire from active business.

He started as a boy in the hardware business in his native town of Port Henry, N. Y. on October 1, 1883, where he remained until March 1886. He then went to Omaha, where he was connected with Himebaugh & Taylor, afterwards known as the Omaha Hardware Company. In 1907 he moved to New Britain, handling the sales for the Hart & Cooley Company. He was familiar with all the hardware trade as far as the Pacific Coast. Totaling his traveling years both east and west, it is something over 50 years and his hardware life covered 57 years. He will remain at the office in New Britain.

REGISTERS, GRILLES, and INDUSTRIAL SCREENS

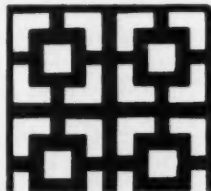


COLD AIR FLOOR FACES SIZE OF MESH $\frac{5}{8}$ " x 1 13/16"

Cold air faces substantially constructed of flat bar stock, having long strips made of .083 (14 gauge steel) x $\frac{1}{2}$ " deep, and strips running short way of .083 (14 gauge steel) x $\frac{3}{4}$ " deep. Large open air capacity; also beveled edges, made in all standard sizes. Furnished in Japanned black, and oak grained finishes.

Fancy Panels for use in oil burners, radiator cabinets, and air conditioning units.

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STANDARD STAMPING & PERFORATING CO.

3137 W. 49th Place, Chicago, Ill.



Dealers agree, today's furnace buyer demands advanced gas-fired equipment—skillfully designed, economical and durable. ☆ That is why these two partners—the AGA "Blue Star" Seal and the PAYNE Testing Laboratory Tag—play a big part in selling PAYNEHEAT. Together they testify that all PAYNE Furnaces have *twice* met the industry's top requirements for design, safety, performance.

PAYNE manufactures a complete lineup of house heating equipment ...backs the Dealer with generous national advertising...and helps the Dealer merchandise, sell and service his furnaces. ☆ To investigate dealer rights in your territory, write J. H. Keber, Sales Manager.



PAYNE vented gas appliances include Modern Console Heaters, Floor Furnaces, Duplex Furnaces, Forced Air Units, Zoneair Units, and Gravity Furnaces.

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Payne FURNACE & SUPPLY CO., INC.
— BEVERLY HILLS • CALIFORNIA —



Big
CUSTOMER
ACCEPTANCE



Big
PROFITS



Big
FACILITIES



Big
IN VALUE

FRONT RANK

HEATING EQUIPMENT leads the field!

Hundreds of thousands of our furnaces in use... that's public acceptance!

And, you know our dealers make satisfactory profits... for they are our dealers year after year.

Despite already big facilities, we are adding more personnel and equipment daily. Indications point to 1941 greatly exceeding our 1940 record business.

Front Rank is quality equipment honestly made... fairly priced! Write for liberal dealer plan.

A Complete Line of Warm Air Heating Equipment
• Cast Iron Furnaces • Steel Furnaces • Stokers • Registers
• Winter Air Conditioning Furnaces • Blowers • Oil Burners

PROFITS TO THE FRONT WITH FRONT RANK
FRONT RANK FURNACE CO.
DIVISION OF LIBERTY FOUNDRY CO.
2500 OHIO AVE., ST. LOUIS, MO.

News Items

Defense Contracts Not Exempted

Contract work for the United States government on national defense projects does not exempt such employers from the payment of contributions for Unemployment Compensation to the State of Illinois on the wages of workers on such jobs, State Director of Labor Martin P. Durkin, announced recently.

Wisconsin Lien Law

Revision of the Wisconsin lien law to give home owners greater protection was recommended November 29 to the Building Congress of Wisconsin and it is believed that steps will be taken in the 1941 legislature to amend the statute so as to put Wisconsin in step with 24 other states that have adopted the uniform act drafted by a national standard act committee in 1932.

The report to the congress, which is a central body representing a score of building and craft organizations and AFL unions, was drafted by a committee which included R. J. Murr, Milwaukee, representing sheet metal contractors.

Prepared in conferences lasting several months, the report said limitation of liens to the contract price would safeguard the interests of owners, labor and materials men and would greatly improve credit practices.

Government Recruits Engineering Draftsmen

Engineering draftsmen in various optional fields are urgently needed by the United States Government. The United States Civil Service Commission has reannounced the examination and will accept applications until December 31, 1941. The salaries range from \$1,620 to \$2,600 a year less a 3½ per cent retirement deduction.

Competitors will not be required to take a written test, but will be rated on their education and experience

THERMO-DRIP

Automatic HUMIDIFIER



**OPERATES IN UNISON WITH THE
HEAT OUTPUT OF THE FURNACE**



BONNET temperatures up or down, the THERMO-DRIP varies the water feed to the vapor pan precisely according to the heat output of the furnace... *automatically!* Thus, vaporization is kept tuned to indoor temperatures for better health, greater comfort—and for increased customer satisfaction with furnace heating. Push THERMO-DRIP. Selling *controlled humidity* is easier than selling "just humidity," especially when it costs no more.

Ask Your Wholesaler or Write Us
For Complete Details

AUTOMATIC HUMIDIFIER CO.
18th and Main Streets CEDAR FALLS, IOWA

as shown in their applications.

Further information and application forms may be obtained from the Secretary of the Board of U. S. Civil Service Examiners at any first- or second-class post office, or from the U. S. Civil Service Commission, Washington, D. C.

Engineering Defense Training Director

Appointment of Roy A. Seaton, Dean of the Division of Engineering, Kansas State College, as Director of the Engineering Defense Training program in the Division of Higher Education of the U. S. Office of Education, was announced recently by Federal Security Administrator Paul V. McNutt.

The Administrator said he had approved Mr. Seaton's appointment upon recommendation of U. S. Commissioner of Education John W. Studebaker. Mr. Seaton will administer the engineering training phase of the educational program for national defense. This program is being developed with the cooperation of the Advisory Commission to the Council of National Defense and the War and Navy Departments.

Commissioner Studebaker stated that Congress recently appropriated \$9,000,000 to enable the nation's engineering colleges to give short, intensive courses to prepare engineers and others with comparable training for technical and supervisory defense work in Government and industry.

He added that courses are of two types—one for those able to devote full time in preparing for future defense jobs, the other for workers now employed who want to fit themselves for more urgent defense assignments.

Assisting Mr. Seaton in maintaining a close, continuous balance between rapidly developing defense needs for technical and supervisory personnel are a staff of engineering educators in the U. S. Office of Education and an advisory committee of 11 nationally known specialists headed by A. A. Potter, Dean of the School of Engineering at Purdue University.

He will be aided by 22 regional advisers.

We Use CLARAGE FANS because Every Wheel is **BOTH** *Statically and Dynamically Balanced*





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At left — complete fan for forced air heating or year-round conditioning. Very compact. Built in 10 sizes.



Or wheels only in any of 10 sizes to give any desired volume and pressure.

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Standardize on Clarage — and protect your jobs against "fan troubles." Perfectly balanced wheels, improved bearings and slow operating speeds insure **QUIETNESS** — guarantee long service. Most widely used equipment in your field. Write for Bulletin 33 and see why!

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SOLE ENGINEERING OFFICE IN ALL PRINCIPAL CITIES

COMPLETE AIR CONDITIONING
COOLING
VENTILATION
FACTORY HEATING
MECHANICAL DRAFT
FANS AND BLOWERS
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Compare the wet strength of Ruberoid 95% pure Asbestos Paper with the average asbestos paper on the market. You will be amazed! This extra strength—obtained by a special processing—saves you time in application.

Ruberoid Asbestos Paper has everything! Wet strength, accurate caliper, color and finish. The color—a soft natural blue-white. The finish—smooth on one side; rough textured for adhesion on the other side.

We urge you to try Ruberoid Asbestos Paper for wrapping furnace pipes—protecting air conditioning ducts, wood partitions, lining stoves, ovens and gas ranges. Mail coupon for free 5-foot sample. Compare its wet strength, flexibility, color, finish and ease of application.

FOR GREATER THICKNESS ASBESTOS ROLL BOARD

Has greater flexibility and strength. Wraps around small diameters without cracking. Plied to make thicknesses $\frac{1}{8}$ and $\frac{1}{4}$.

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Since Ruberoid sells through wholesale trade only, please give jobber's name.

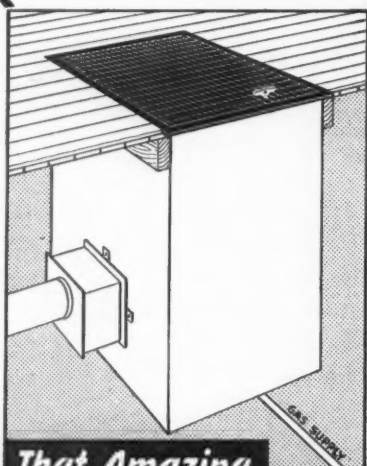


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That Amazing
JOHN ZINK
FLOOR FURNACE



As you would expect this
Furnace features a larger,
improved combustion
chamber and a One-port
Non-plugging Gas Burner.

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New York City

Konzo—Controls For Forced Air Heating

(Continued from page 57)

QUESTION 32.—I gather from your preceding remarks that if the bonnet switch indicator is moved downwards from say 175 deg. to 150 deg. that the blower operation is increased.

ANSWER 32.—Correct.

QUESTION 33.—Suppose the indicator on the bonnet switch is moved down even further to 125 deg. or even 100 deg.?

ANSWER 33.—If the rest of the heating plant is not changed in any way, then on any given day, the blower operation would be increased more and more as the indicator is moved downwards.

QUESTION 34.—If the indicator pointer is moved down far enough would continuous fan operation be obtained?

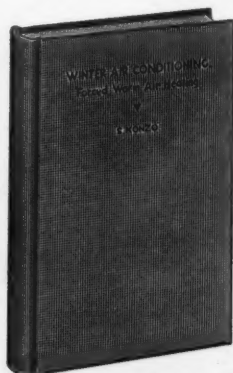
ANSWER 34.—Yes.

QUESTION 35.—What would be wrong with that?

ANSWER 35.—If the bonnet switch indicator is reduced too low, very low air temperatures would be delivered at the registers, and there would exist the possibilities of having drafts in the living zone.

QUESTION 36.—If I used high sidewall locations

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Forced Warm Air Heating
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by S. KONZO
Research Assistant Professor
University of Illinois

Embodied in this 532 page volume is the complete record and explanation of the results of the forced air heating studies carried out in the Research Residence at the University of Illinois. It is filled with basic information that heating men everywhere will find invaluable as a guide to correct and up-to-date practice in the design and installation of forced air heating and residential air conditioning systems. WINTER AIR CONDITIONING belongs in the hands of everyone interested in or doing residential air conditioning work. As this book has been published by the National Warm Air Heating and Air Conditioning Association to make its invaluable data readily available to all it is offered to the industry at the low non-profit price of only \$3.00 per copy. To obtain this book promptly, send your order and remittance today to the address below.

KEENEY PUBLISHING COMPANY
6 N. Michigan Ave. Chicago, Illinois

for the registers throughout the house could I use lower bonnet switch settings than if I used baseboard locations for the warm air registers?

ANSWER 36.—Yes. Drafts caused by cool air issuing from the warm air registers are more likely to occur with baseboard registers than with high sidewall registers, for the same temperature of the air leaving the register.

If the maximum amount of blower operation is desired, then the bonnet switch setting should only be reduced to a temperature at which no drafts are experienced in the room. That may mean in the average case, that the bonnet air temperature should not be less than about 120-135 deg. for baseboard registers and possibly not less than about 110-120 deg. for high sidewall register installations.

QUESTION 37.—What advantages are there in having more blower operation?

ANSWER 37.—Briefly the results would consist of higher bonnet efficiencies, better heat distribution, uniformly maintained balance of room temperatures in the various rooms, smaller temperature differences from the floor to the breathing level, and positive control of the air circulation in the house.

[To Be Continued]

DEALERS!

There are great profits for you in . . .

CONVECTOR AUTOMATIC HUMIDIFIERS



Here is the most saleable humidifier in the Warm Air Heating Field . . . the humidifier that delivers more pounds of humidification per dollar cost than any other . . . the only humidifier that has National Plumbing Laboratory acceptance against back siphonage codes . . . the humidifier that is built to last . . . priced to sell, and make you a handsome profit. These Maid-O-Mist Automatic Humidifiers for Warm Air and Floor Furnaces assure ample humidification, are easy to install and fool-proof in operation. Made in 18 sizes with single, double and four troughs and designed to fit straight or sloping bonnets, they meet the humidification requirements of the largest or smallest furnaces. They are made with either automatic or drip feeds. The water feeder on the Automatic Convector is made of brass, copper and Monel Metal, the float is made of copper, and all are completely nickel plated to avoid the possibility of corrosion. Copper troughs are spaced one inch apart assuring unrestricted air flow through the Patented Metal Edge Replaceable Evaporators. Remember, Maid-O-Mist Humidifiers are Standard Equipment on many of the country's leading furnaces.

Maid-O-Mist manufactures humidifiers for all types of Warm Air, Steam, Hot Water, and Vapor Heating Systems.

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AIR-MAZE

FILTER PANELS

are Specially Engineered
for Many and Diverse Uses

The AIR-MAZE panel is perhaps best known as a highly efficient, all-metal, permanent and cleanable air filter for Industrial and Residential Air Conditioning. However it has scores of other important uses for each of which the filter element is specially engineered. A few of these diverse uses follow:



AIR-MAZE for Industrial Ventilation

Many industries whose processes demand dust-free air for great precision and low cost production, as well as for health protection, depend on AIR-MAZE filter panels.

AIR-MAZE "Greastop" for Capturing Entrained Grease

Hotels and restaurants have found in AIR-MAZE "Greastop" panels the effective way to capture grease entrained in the air over kitchen ranges, thus preventing duct fires and protecting health.



AIR-MAZE for Paint Spray Booths

AIR-MAZE panels are used in Paint Spray Booths to prevent excess sprayed material from permeating exhausted air and thereby avoiding deposits outside on persons and buildings.

AIR-MAZE "Inkstop" for Catching Entrained Ink

In the printing industry ventilating devices equipped with AIR-MAZE "Inkstop" panels solve the problem of collecting entrained ink in the air during speed production work.



AIR-MAZE for Eliminating Entrained Moisture

Where entrained moisture in the air must be eliminated, as in evaporative condensers, some types of cooling equipment and certain industrial processes, special AIR-MAZE filter panels effectively take care of the trouble.

AIR-MAZE for Coping with Entrained Oil

Entrained oil in the air of Oil Spray Booths, Machine Shops and Industrial Plants is often an annoying problem. AIR-MAZE filter panels provide the effective remedy.

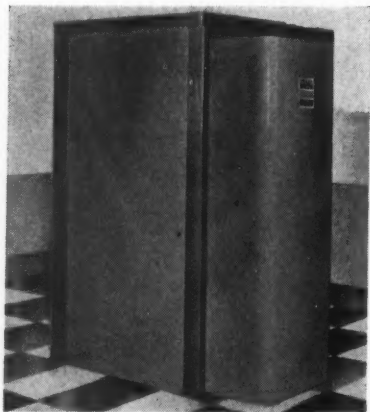


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SUN FUEL MASTER



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MUST be Good!**

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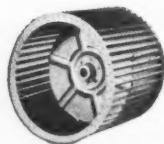
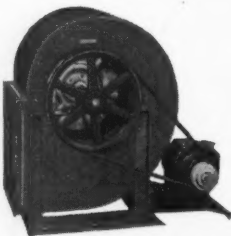
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● BLOWERS FOR EVERY PURPOSE

HY-DUTY Blowers, 9 3/4" to 25".
Top and Bottom Horizontal, and Top
and Bottom Vertical Discharge.
Top and Bottom Motor Mounting.
Dual Units also available.



● CENTER DISC WHEEL

Double Inlet, Double Width.
Reinforced Center Disc.
Designed for Modern Air Conditioning and
Heating Applications.
Sizes, 4 1/2" to 50".

● SINGLE INLET WHEELS

For Oil Burner, Stoker, and Air Conditioning
Applications.
Sizes, 4 1/2" to 50".
Variety of Blade Lengths for each diameter.



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Write for Catalogues showing complete Performance Data.
Experienced Engineering Department available to help solve your
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**BLOWER DIVISION
SCHWITZER-CUMMINS COMPANY**
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Kruckman's Washington Letter

(Continued from page 43)

bathrooms. Oil, coal or gas is used according to geographical location.

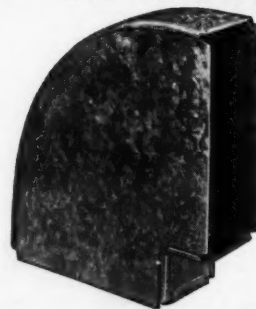
Defense Homes Corporation is building the first group of 165 units, single-family dwellings, at Jacksonville, Fla. They are 4 and 5 room houses, averaging between 750 and 850 square feet, with basement, having warm air, coal furnaces with ducts. These houses cost \$3,000. In the North DHC will build houses of a similar type costing \$3,500 with cellars and oil burning warm air heating systems. These are frame houses, with some brick finish, built according to FHA specifications. They are built by contractors on a cost-plus-fixed-fee basis. Large numbers of such houses will be built at Hartford, Buffalo, Philadelphia, District of Columbia, Cincinnati, Norfolk, Pittsburgh, Columbus, Cleveland, Detroit, Chicago, Milwaukee, Richmond, Kansas City, Topeka, Denver, Salt Lake City, Birmingham, Minneapolis, Des Moines, Memphis, San Francisco, Portland, Spokane, Los Angeles, Tacoma, Seattle, and elsewhere.

There are plans, but neither allocations nor contracts, for 47,888 defense housing units. Of these the Navy will build 31,835 units, the Army 10,853 units, and Industrial Defense housing

AJAX

PREFABRICATED DUCTS—FITTINGS
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"B" (Forced Air Fittings) are yours on request.

**THE CINCINNATI
SHEET METAL & ROOFING CO.**

Furnace Fitting Department

230 E. Front St.

Cincinnati, Ohio

5,200 units. *California* will have 9,200 units (Army) 800 at Ft. Ord, Fresno, Stockton; (Navy) 8,400 at Mare Island, Vallejo, San Diego. *Connecticut*, 1,600 units, to be built by industrial defense agencies at Hartford and New London. *Colorado* (Army) at Lowry Field, 125. *District of Columbia* (Navy) upwards of 325. *Florida*, 1,500 units (Army) 100, Orlando; (Navy) Pensacola, 400; Jacksonville, 1,000. *Maryland*, Indian Head (Navy) 350, (Army) Aberdeen, Baltimore, Edgewood, Havre de Grace, Indian Head, 1,750. *Georgia* (Army) Augusta, Rossville, Savannah, 375.

Illinois (Army) Belleville, Moline, Rantoul, Savanna, 700. *Maine* (Army) Bangor, 150. *Massachusetts* (Navy) Boston, South Boston, Chelsea, Quincy, 1,150. *New Hampshire* (Navy) Portsmouth, 600; defense industries, Portsmouth, 800. *New Jersey* (Army) Long Branch, 265; defense industries, Camden, upwards of 500. *New York* (Army) Fishers Island Village, upwards of 20. *Nevada* (Navy) Hawthorne, 150. *Pennsylvania* (Navy) Philadelphia, upwards of 500. *North Carolina* (Army) Fayetteville, Charleston, Columbia, 1,250. *Rhode Island* (Navy) Newport, Quonset Point, 2,200. *South Carolina* (Navy) Charleston, 1,875. *Texas* (Navy) Corpus Christi, 1,000; (Army) Houston, San Antonio, 417. *Virginia* (Navy) Newport News, Yorktown, 1,200; (Army) Arlington, 35. *Virgin Islands* (Army) (Navy) 200. *Washington*

Randall PILLOW BLOCKS

dependable
low-cost
long-lived

Quiet

There are more air-handling units equipped with Randall Pillow Blocks than any other. Years of satisfactory service in the field proves the correctness of these installations.

Self-aligning and self-lubricating Randalls give long, trouble-free, reliable operation with only minimum maintenance. If Randalls are not now standard on your equipment, write for the new 1941 catalog showing an efficient Randall for every pillow block need.



One-Piece Steel
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BURT MONOVENT

Continuous Ridge
VENTILATOR



**Specially Adapted
for Industrial
Buildings**

**Simplifies Installa-
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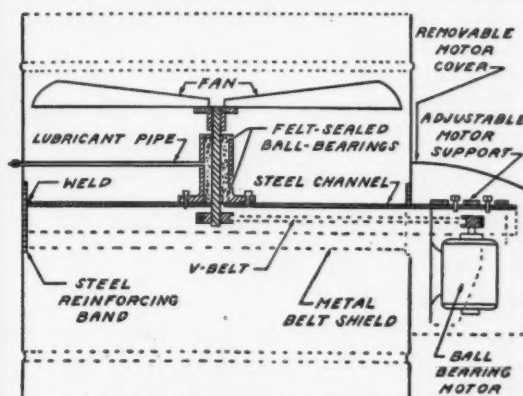
Wherever they want good reliable ventilation and want the job in a hurry, that is the place for Monovent. Provides continuous outlet of air along entire length of building. Costs $\frac{1}{3}$ less than unit ventilators of same capacity. Presents more attractive appearance. Sturdy and simple. Easy to install on any type of roof.

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are glad to
help on plans

Remote Drive Fan Sections



For special installations where positive ventilation must be supplied, yet where a motor would introduce an element of danger, the efficient Allen Remote Drive Fan Sections are ideal. They are especially applicable to such requirements as spray booths, inflammable gas operations, etc. The motor, located outside of the stack, drives the aluminum propeller by V-belt, totally enclosed in a steel channel which supports the ball-bearing hub. Complete specifications of this equipment are given in our free catalog sheet,—ask for a copy for your file.

Other Allen industrial equipment includes Alco Fan Ventilators, Standard Fan Ventilators, Allen Turbine Fan Ventilators, Auxiliary Fan Sections, Iso-Motor Fan Ventilators, and the famous Allen Coni-Vane Turbine Ventilators and Electro-Wind Turbine Ventilators.

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9752 Erwin Avenue, Detroit, Michigan

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A 65,000 B.t.u. forced-air furnace, in a cabinet only 14" x 26" x 61"



This compact design is possible only with Utility's exclusive

Uni-Therm
multiple-finned,
hollow-baffle element



The Utility line includes other proportionately compact Uni-Therm closet and basement forced-air furnaces; also the famous Thermaflo forced-air circulating heaters, and Sol-Air floor and dual register furnaces.



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THE SAL-MO reputation for quality asbestos products was gained only through years of satisfactory service. Your jobber has confidence in SAL-MO quality and is in position to quickly furnish you with the right materials for insulating all types of Warm Air Heating and Air Conditioning Equipment, Furnace Cements, Asbestos Coverings for all kinds of Piping—Steam, Hot and Cold Water, and Flexible Asbestos Jackets for Hot Water Tanks. Also Duct insulation for air conditioning, etc.

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176 West Adams Street

Chicago, Illinois

(Navy) Bremerton, Seattle, 1,550; (Army) Ft. Lewis, South Tacoma, Spokane, 560. *Canal Zone* (Navy) Coco Solo, 2,000; (Army) Albrook Field, 2,145. *Hawaii* (Navy) Oahu, 8,100; (Army) Oahu, Schofield Barracks, Honolulu, 1,612. *Puerto Rico* (Army) Ponce, Cayey, 230. *Kentucky* (Army) Ft. Knox, 219.

Fume Removal For 1,500 Gases

(Continued from page 67)

inlet. Air velocity through individual hoods is controlled by opening or closing slide windows. Sufficient air to provide 3,000 ft. per min. velocity through all hoods with their slides open was provided by a 45-in. cased, exhaust fan belted to a 3 hp. motor.

Proper suspension of fans and motors presented a problem. All machinery was set on 3-in.-thick cork slab. All platforms were ceiling suspended as well as wall supported. In the case of the largest fan, that is, the unit that handled the large general room, basic support was by two 6-in. I-beams run diagonally in a corner of the room 10 ft. overhead. Beam terminii were bolted to walls, also were suspended by 1/2-in. rods bolted at their upper ends to structural steel building framing. Fig. 2 shows all details of platform construction.

Premier FURNACE CLEANER

**TOP PERFORMANCE
..COLD OR UNDER FIRE!**



● You can start right in making money and getting leads on new business with this one-man furnace cleaner. It cleans either "cold" or "under fire." It's light, easy to carry and use. It does *double duty* since it may be used as a blower as well as for suction cleaning. Rugged, simplified construction gives you long years of money-making service! Write today for complete information!

**NEW IMPROVED MODELS
Completely Equipped**

5/8 H.P. . . . \$69⁵⁰
1 H.P. . . . \$89⁵⁰

**ELECTRIC VACUUM
CLEANER CO., INC.**

1730 Ivanhoe Rd. • Cleveland, O.

Complete Chimney
Cleaning Equipment
Only \$9.00.

20 Ways To Minimize Your Taxes

(Continued from page 44)

year, these petty outlays may total a sizable sum. Dealers should handle petty cash disbursements systematically by means of a "Petty Cash Fund," or a medium equally as effective.

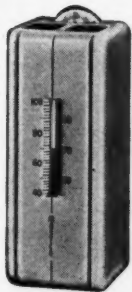
14. Take the permissible credit for a loss carry-over. The 1939 amendment to the Internal Revenue Code allows the taxpayer to carry over losses sustained in 1939 as a deduction from 1940 income, and if the loss is greater than 1940 income, the excess may be carried into 1941. Such losses may extend for two years.

15. Keep a tax calendar showing due dates on taxes, when returns are mailed, payments made, total tax due, etc. This calendar should cover all taxes, Social Security, sales tax, Federal and state income taxes, etc. With 35 states having some form of income tax law, about 25 per cent levying a "use" tax, about 75 per cent requiring returns of some kind plus Federal taxes, the taxpayer should record his taxes in as concise a manner as possible, thus simplifying analysis at any time. This record, of course, is supplemental to the book records.

16. Set up a reserve for taxes at the beginning of each year, thereby charging each month

ACCURATE

DEPENDABLE



MASTER HEAT REGULATOR

TYPE A-23

Carefully designed for maximum efficiency, this positive, snap-action regulator operates on a differential of only $\frac{1}{2}$ degree. Popular priced, yet noted for its long life and trouble-free operation.

Build goodwill and satisfied customers by equipping all heating plants with Master Heat Regulators.

Write today for bulletin giving complete information on the Master line.

Makers of Dependable Regulators for 25 Years.

WHITE MFG. CO.

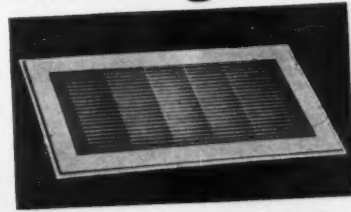
2368 University Ave.

ST. PAUL, MINN.

"BEF" Floor Registers

offer

4



IMPORTANT EXTRAS

Super-close $\frac{1}{4}$ " mesh, prevents heels from catching in louvers, keeps small objects from falling into the duct. Extra rugged construction—long, trouble-free service. Smart, attractive, streamlined appearance. Unusually efficient! Register face provides directional flow from floor; 84% free area. Write for free details, prices.

WATERLOO REGISTER CO.

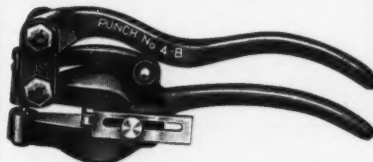
WATERLOO, IOWA

SEATTLE, WASH.

Representatives in Principal Cities

WATERLOO REGISTERS

WHITNEY LEVER PUNCHES



NUMBER
FOUR "B"
PUNCH

This punch for sheet metal work has a capacity of $\frac{1}{4}$ " through 16 gauge. Weight 3 lb. Length 8 $\frac{1}{2}$ ". Depth of throat 2". Complete tool includes three punches and three dies of specified sizes with die adjusting key. A time-saver for your up-to-date shop.



NUMBER TWO
PUNCH

And here's another handy tool for the modern shop—the No. 2 Punch. Length 23". Capacity $\frac{5}{16}$ " through $\frac{1}{4}$ " iron, weight 12 lbs., depth of throat 1-11/16". Punches and dies $\frac{3}{32}$ " to $\frac{1}{2}$ " by $\frac{1}{84}$ ".

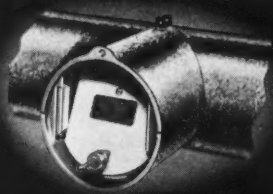


WHITNEY MFG. CO.

636 RACE ST. ROCKFORD, ILL.

FIELD BAROMETRIC DRAFT CONTROL

Recognized by heating equipment manufacturers and dealers as the most accurate and dependable of draft controls. A precision instrument that increases customer satisfaction — reduces service calls caused by faulty draft operation. Commercial types also available. Write for literature.



Type "M"

FIELD DRAFT CONTROL DIVISION - MENDOTA, ILL.
MAKE A FIELD CONTROL STANDARD EQUIPMENT

Start Your Spring Business Now

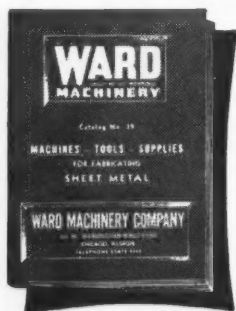
with a
**GRAND RAPIDS
FURNACE
CLEANER**

Free Trial
Convenient Terms



Write for
Details

DOYLE VACUUM CLEANER CO.
227 STEVENS ST., S. W. GRAND RAPIDS, MICH.



Have You the Ward Catalog—and Latest Net Price Sheet?

Devoted entirely to machines, tools and supplies for fabricating sheet metals exclusively. If not write us today.

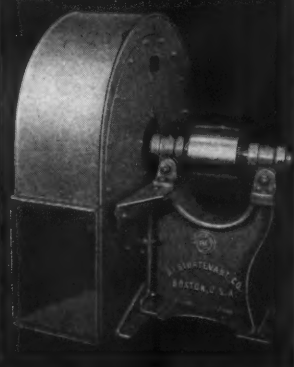
WARD MACHINERY CO.
564 W. Washington Blvd., Chicago, Illinois

MILL EXHAUSTERS

1. Designed and built by the Pioneer exhauster manufacturer.
2. Result of over 80 years of air engineering experience.
3. High efficiency assures low power consumption.
4. Sturdy construction assures dependable service.

Write for Catalog No. 430

B. F. STURTEVANT CO.
Hyde Park, Boston, Mass.
Branches in Principal Cities



for its pro-rata share of the annual tax expense, otherwise, the months in which taxes are paid will be charged too heavily with this expense. A reserve spreads the tax expense evenly.

17. Plan for tax economy. Give consideration throughout the year to your tax problems, the same as to other expenses. The taxpayer cannot afford to wait until filing time to consider his tax problems any more than he can forget other expenses until the end of the year and then settle up in a lump sum without further ado.

18. When a transaction may be interpreted in two different ways, use the interpretation in your favor. This is not tax evasion. It is tax avoidance. There is a difference. The Supreme Court has ruled that, "The legal right of the taxpayer to decrease the amount of what otherwise would be his taxes or altogether avoid them, by means which the law permits, cannot be doubted. It is well settled that a taxpayer may resort to any legal methods available to depreciate the amount of tax, so long as his efforts are confined to law."

19. Deduct for bad debts when it can be reasonably substantiated that they are worthless. Many dealers carry worthless accounts on their books indefinitely when they could reduce tax payments by writing them off. If you collect on these accounts in later years, include the payments with "Gross income." Because you reduce your taxes by writing off the bad debts, you must reimburse the Treasury Department if any or all of the debtors subsequently pay up. However, try to write off bad debts in a loss year.

20. If in doubt about your ability to effect all possible tax economies, get expert guidance. An accountant, tax practitioner, your banker or the nearest income tax office may be consulted.

Vocational Schools

(Continued from page 78)

Virginia

Petersburg	Virginia State College for Negroes
Portsmouth	Woodrow Wilson High School
Washington Co.	Regional Training School

Washington

Bremerton	Bremerton Union High School
Seattle	Thomas A. Edison Vocational School

West Virginia

Huntington	Huntington East High School
------------	-----------------------------

Wisconsin

Green Bay	Green Bay Vocational School
Manitowoc	Manitowoc Vocational School
Milwaukee	Milwaukee Vocational School
Oshkosh	Oshkosh Vocational School
Racine	Racine Vocational School
Superior	Superior Vocational School
Wausau	Wausau Vocational School

"Your Representative Offered Many Helpful Suggestions"

"The Williamson Heater Company:

"We wish to assure you that we are one dealer who does read your advertisements in the trade papers. In fact, we look for them to use as recommendations to our customers.

"We also wish to say that we thoroughly agree with those letters, which have been sent in by dealers, as our personal experience in carrying the Williamson Line justifies our feeling the same way.

"We have installed your furnaces for the past six years; and in a few installations where engineering services were required, your representative, Fred Goodall, has always come to our rescue, and has offered many helpful suggestions."

Signed—X Y Z, . . . Illinois.

Complete information; name, address of writer of above letter furnished on request. Phone, wire or write The Williamson Heater Company.

FREE: Complete, easily understood short method for figuring air conditioning job. You can complete your figures, price job in one hour flat. Write Dept. No. 2. The Williamson Heater Company, Cincinnati, Ohio.

Complete Line . . . Quick Service

WILLIAMSON

WARM AIR FURNACES

This is our Fifty-first year

This FREE CATALOG

will help you select
the **WELDER** you need
Send for it today

Choose wisely.
Find out about
all four new
models before
you decide!

Emerson-Electric, Multiple-Service A-C Arc Welders cost less to buy, less to operate, less to maintain, give longer service. Continuous duty. APPROVED by UNDERWRITERS'.

Sizes: 75, 150, 200 and 300 Amp. models. Up to 30 welding heats. Take rods up to 1/4" diameter! Portable, compact, streamlined. Wide variety of uses, from home and garage service to heavy castings and structural steel. Before you buy ask for catalog No. 516.

THE EMERSON ELECTRIC MFG. CO. • ST. LOUIS, MO.



BENDING
BRAKES

WHITNEY-JENSEN

METAL
TOOLS

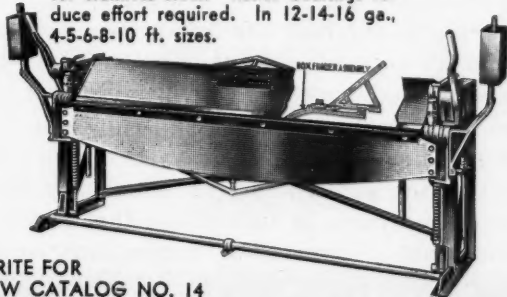


NEW NO. 17 BENCH PUNCH IMPROVED MODEL OFFERS MANY GREATER-VALUE FEATURES

Throat depth now 6 1/2", height of throat now 1 1/8". Fabricated of welded steel plate, with a weight reduction of 30%. Capacity, 1/4" hole in 1/4" iron. Convenient depth and side gauges have been added, as shown. Work table 6" x 8", tapped for 1/4" x 20 machine screws. Three punches and dies included.

COMBINATION BENDING BRAKES

For box and pan bending, as well as all types of straight bending, seam pressing, etc. Hardened jaws for stainless steel. Roller bearings reduce effort required. In 12-14-16 ga., 4-5-6-8-10 ft. sizes.



WRITE FOR
NEW CATALOG NO. 14

WHITNEY METAL TOOL CO. • 91 Forbes Street, Rockford, Illinois



Quick Easy Way to Get More Roof Ventilating Jobs —

Show the Swartwout AIRJECTOR

More ventilator jobs come your way when you sell the superior advantages of Swartwout Airjectors. This rotary-head power ventilator expels more heat, smoke, fumes at lower power cost. Comes ready to install, gives you pride in the finished job. Write today for details, prices.

THE SWARTWOUT CO., 18615 Euclid Ave., Cleveland, Ohio

Swartwout

VENTILATION SPECIALISTS

"BB" QUALITY

Order from your jobber



Saves time and labor

"BB" SPRING CIRCLE CLIP

Furnished only with "BB" Circles at no extra charge over old style straps.

BERGER BROTHERS CO.

229-237 Arch St., Philadelphia, Pa. 16th and Grove Sts., Jersey City, N. J.

1941 IS YOUR YEAR FOR PROFITS

ARE YOU READY FOR THEM? ?

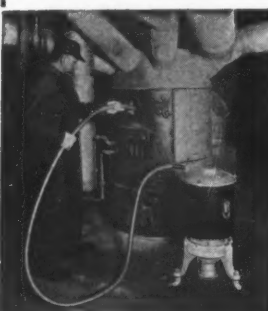
1. Is your furnace cleaner all ready for your busy spring season?
2. Do you have a **GOOD** furnace cleaner? One that is fast, powerful, easily portable, sturdy—**BUILT TO LAST?**

If not, you want information on the **KENT DOUBLE SUCTION FURNACE CLEANER.**

Investigate the Kents and **BE READY FOR YOUR SPRING PROFITS.**

Write **TODAY** for full details.

THE KENT COMPANY, Inc.
167 Canal St. Rome, N. Y.
Branches in principal cities.



"NEW FIELDS for Profits in NEW METALS"

- CHROME FINISHED COPPER
- CHROME FINISHED STEEL

Write us regarding your problems of designing and trim on interior and exterior finishes.

APOLLO METAL WORKS
6653 S. Oak Park Chicago, Ill.

Repair parts

FOR ALL HEATING UNITS

A. G. BRAUER SUPPLY CO.
Distributors of All Heating and Air Conditioning Equipment

2100 Washington Ave. St. Louis, Mo.



Illinois Convention

(Continued from page 83)

country. (This code is discussed in detail in the January issue of *AMERICAN ARTISAN*.)

Mr. Caylor described the toughest problem facing the heating man as the problem of convincing the home owner of the inherent value of the equipment and the installation which the dealer proposes. One answer, declared the speaker, is for the dealer to submit to the home owner a complete proposal which describes in detail exactly what the dealer proposes to install. According to the speaker, some dealers leave such a proposal with the home owners, while other dealers leave only a part of the proposal so that the home owner cannot peddle the proposal from one heating contractor to another. As a sales suggestion, Mr. Caylor declared the dealer first of all should pick out a well-established and a well-engineered gas furnace and in all cases should thereafter point out these features in detail to each prospect. Such a method will establish the value of the equipment in the prospects mind.

The new "Yardstick" prepared by Prof. S. Konzo and distributed by the National Warm Air Heating and Air Conditioning Association was described briefly by J. D. Wilder, *AMERICAN ARTISAN*. A few copies of the Yardstick were available and these were passed out to contractors during the explanation. The Yardstick takes up all the important points of a well designed system and shows by drawings and text what constitutes good, mediocre and poor practice relating to each of these important features.

Proper Copper Application

Carter S. Cole of Copper and Brass Research Association, New York City, presented an illustrated lecture describing good and bad practices in sheet metal application. He proved that copper can be applied lastingly by old copper roofs which have been in service since 1320, 1520, 1550, 1610 and, in the United States, copper roofs more than 200 years old. Mr. Cole described the basic requirements for long life as—proper anchorage so that all copper parts are free to move with expansion and contraction; firm cleating with large cleats and non-ferrous nails to a sound and substantial sub-structure; no parts of the copper nailed to the substructure or seamed or tied to other copper parts in such a way that movement is restricted or prevented; connections between changes in slope or changes in contour so designed that the two parts are free to move even in direct contrast to one another. Mr. Carter

TRIMTHERM

GENERAL CONTROLS THERMOSTAT OF TOMORROW



T-80 Series Thermostats for use with all B-60 Series Gas Heating Controls

SURFACE MOUNTING

With flush appearance; no recess in wall.

1/2° F. DIFFERENTIAL

Without false heat input.

UNOBTRUSIVE

Extends but 13/16" off the wall.

CORRECT DESIGN

Harmonizes with vertical walls.

PLASTIC BASE

Thermally isolates thermostat from wall.

VISIBLE MARKINGS

All calibrations easy to read.

KNOB ON COVER

No wall smear.

Described in the new 1941 Catalog. Write for your copy.

GENERAL

267 Fifth Avenue
NEW YORK CITY



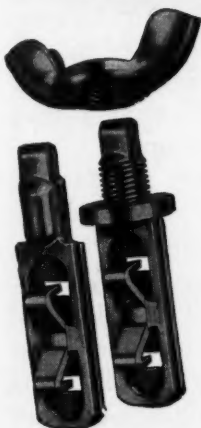
CONTROLS

450 East Ohio Street
CHICAGO, ILLINOIS

Distributors and Stocks in all Principal Cities

HEATING CONTRACTORS!

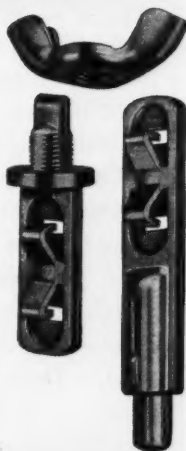
ELIMINATE ... LOST MOTION ... LOST JOBS ...
LOST PROFITS WITH E-Z-ON DAMPER REGULATORS IN '41. GREATER EFFICIENCY ... MORE PROFITS BECAUSE E-Z-ON REGULATORS DO YOUR JOB BETTER AND QUICKER AT LESS COST.



ASK THE MAN
WHO USES
E-Z-ON

WRITE FOR
FREE SAMPLE

◀ E-Z-ON Standard
E-Z-ON Snap-Tite ▶



M. A. GERETT CORP.

2947 N. 30th Street • Milwaukee, Wisconsin

QUALITY EQUIPMENT-- FROM HESS-- COSTS LESS

DEALERS---Write for our New 1941 Portfolio

By selling — repairing, modernizing or replacements, needed by owners of a majority of heating plants now in use.

• • • • •
HESS BLOWER FILTER UNITS

HESS WELDED STEEL FURNACES

HESS AUTOMATIC OIL BURNERS

HESS AUTOMATIC COAL STOKERS

• • • • •
ARE GREATEST VALUES

AT LOWEST PRICES

• • • • •
The Hess line is complete for every dealer requirement, distinctively different and more saleable. Financing plan and territory plan—helps Hess dealers.

WRITE FOR DEALER PORTFOLIO
HESS WARMING & VENTILATING CO.
1211-27 S. WESTERN AVE. Founded 1873
CHICAGO, ILLINOIS

NEW

AIR CONDITIONING REGISTERS

The New Rock Island line of Air Conditioning Registers now shown in complete new catalogue just off the press.



No. 822 Wall Register---Horizontal Vanes

The New Rock Island Air-Vane Registers are of bar type fabricated construction—Attractive Appearance—Rigid Construction—Vertical or Horizontal Vanes—Simple, secure adjustment.

New Catalogue and Dealers Net Estimating Book, a time and money saver, gives full particulars, prices, etc.

Mail Coupon Today

ROCK ISLAND REGISTER CO.

Rock Island, Ill.

Mail me a copy of your new catalogue and dealer's net estimating book.

Name

Street Address

City & State

This Man Sells More Furnaces Than

all your staff sell. Because only he can learn and can tell your salesmen in advance what each prospect needs. No more calls cold turkey. Why not use this man? On request, he works free for five days, — makes good money—you keep it all. Why not request?



Bigger, stronger, motor $\frac{3}{4}$ hp Prony Brake Test (the reliable), 30" high, 16" wide, 46 pounds, rugged construction. Best materials throughout.

The National Super Service Co.
1944 N. 13th St. Toledo, Ohio



PARKER-KALON Jiffy REGULATOR SET

For controlling dampers in heating, ventilating, air conditioning systems.

PARKER-KALON CORP., 200 VARICK ST.
NEW YORK, N. Y.

SIMPLE... LOW COST

SAVES TIME

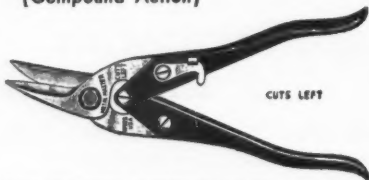
AND LABOR

INSTALLED IN
A JIFFY!



SOLD ONLY THROUGH RECOGNIZED DISTRIBUTORS

WISS "METAL-MASTER" SNIPS (Compound Action)



"TWICE
THE WORK
WITH HALF
THE
EFFORT"

TWO MATCHED PATTERNS M1 (Cuts Left) M2 (Cuts Right) Cut circles, squares and any irregular patterns on Stainless, Dural and Monel Metals with the greatest of ease. Jaws of wear-resisting Manganese Molybdenum Steel. Handles hot-pressed from tough Chrome Vanadium Steel. Nickel steel bolts and nuts to Government specifications. All parts interchangeable. Detachable rubber handle grips at slight extra cost.

J. WISS & SONS CO.

ESTABLISHED 1848

NEWARK, N. J.

• BARBER

Gas Pressure REGULATORS

for Reliability!

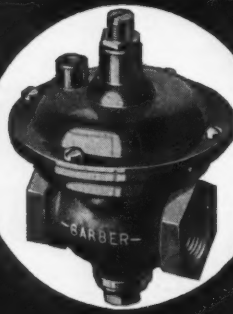
Certified by A. G. A. Testing Laboratory.
Write for Catalog and prices on Barber
Conversion Burners, Appliance Burners,
and Regulators.

THE BARBER GAS BURNER CO.

3702-4 Superior Avenue

CLEVELAND

OHIO



Sizes $\frac{1}{4}$ " up

showed numerous slides of proper and faulty copper application similar to the photographs presented in the series of articles by Mr. Cole in *AMERICAN ARTISAN* during 1939 and 1940.

Howard V. Clark, Carnegie Illinois Steel Corporation, Pittsburgh, prefaced moving pictures of steel manufacture with a brief outline of the progress made in recent years by the steel industry and the present status of the steel market. He described the change in steel manufacture from the days of hand rolling methods to the present continuous mill; the changes in consumption from the days of very small orders by many scattered customers to the present market for millions of tons of sheet by such large consumers as the automotive plants. He also described some of today's problems of metallurgy.

Ralph Poe, formerly secretary of the state association, and now instructor in sheet metal training at Bradley Polytechnic Institute, Peoria, described the courses in sheet metal training being offered by the institute and described his short-cut pattern method which is being used in the school.

Entertainment for the two-day meeting consisted of a stag party for contractors and salesmen on the first night and a banquet and interesting magician on the closing night.

The Illinois Travelers' Division held their meeting simultaneously and again offered their services in obtaining additional membership and stimulating interest in the state association.

Technical Code— Precalculated

(Continued from page 51)

tors. The writer has tried to make a layout that would have good heating characteristics and still allow for structural variations. A designer, not seeing the building, or knowing the contractor's type of work, has to do a certain amount of guessing. For instance under FHA the joists may be carried on top of the beam, or notched to it with 4 inch clearance on top. If on top they may be either lapped, or butted and strapped.

This particular job would be more satisfactory if the partition between the stairway and the dining room could be used. Framing a house so it is possible to use this partition is relatively simple, but some inspectors will not pass it unless it has been detailed and approved on the original plan. There are also carpenters who insist it cannot be done. Therefore, the partition between the dining room and kitchen was used. Here it is impossible to tell just where pipes will be, although if the plumber and sheet metal man work together, there should be no difficulty.

THE AKRON AIR BLAST FURNACE

"More than 50 Years
of Leadership"

LEADERSHIP is attained only through consistently good service to the customer. That's why the Akron Air Blast Furnace is the leader in the field. For over fifty years there has been the same uncompromising quality built into these furnaces and the value of such a policy reflects in the success the AKRON has enjoyed for the past half century.

The strength, economy and efficiency of the AKRON are directly traceable to its superior construction. Circular roller bearing grates, two-section firepot, three-way Air Blast which extracts every last bit of energy from the fuel, heavy feed section, and a radiator with more prime heating surface combine to make the AKRON the quality furnace among the top notchers.

A postcard request will bring you further information.



**WRITE
NOW**
for
Literature

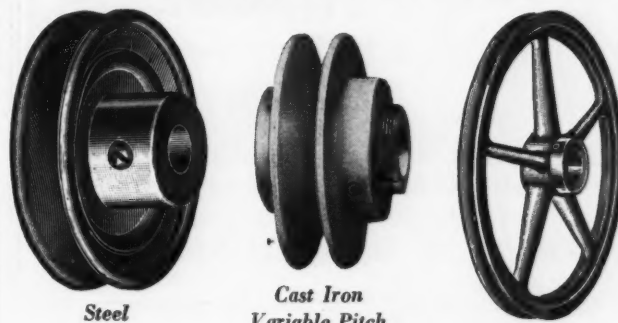
THE MAY-FIEBEGER COMPANY
NEWARK OHIO

✓ *Accurate*
✓ *Convenient*
✓ *Complete*

... That's the story behind the success of **AMERICAN ARTISAN'S** Annual Directory and Show Number to be published next January. Its completeness, accuracy and convenience have made it indispensable to engineers and contractors throughout the year for reliable reference in their buying and specifying work. Further information gladly sent on request.

KEENEY PUBLISHING COMPANY
6 North Michigan Ave. Chicago, Ill.

Those Who **MUST** Have DEPENDABLE PERFORMANCE Choose **MAUREY V-PULLEYS**



Steel

Cast Iron
Variable Pitch

Cast Iron

Heating and Air Conditioning Plants, Refrigeration Units, Fans, Blowers, Stokers and similar installations **MUST** have dependable V-Pulleys for F. H. P. Transmission.

Manufacturers of apparatus of this kind have found that Maurey V-Pulleys installed in their units assure unfailing dependability that can be guaranteed against "break-down" caused by pulley failure.

When considering V-Pulley requirements, be sure to compare Maurey V-Pulleys with any other V-Pulleys made, for Design, Workmanship, Appearance and Performance.

Write for Circulars Describing Maurey Steel, Cast Iron, and Variable Pitch Diameter V-Pulleys.

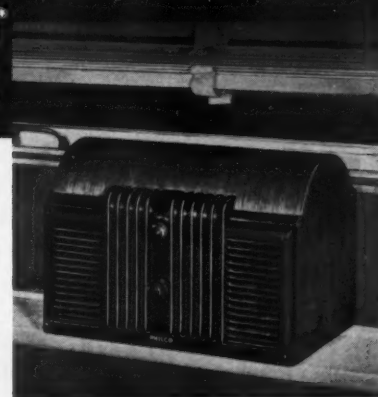
MAUREY MANUFACTURING CORP.
Wabash at 29th Street, Chicago, Illinois

NEW PHILCO ROOM VENTILATOR

Only \$**39⁵⁰**
LIST PRICE

**Opens Up Big
All Year 'Round
Business for You!**

Priced lower than ever before! Based on an entirely new engineering principle that gives it all the efficiency of units costing twice as much!



- Brings in Fresh, Clean, Filtered Air . . . 475 Cubic Feet Per Minute.
- Shuts out Noise, Dirt, Dust.
- Exhausts Stale, Stuffy Room Air . . . 110 Cubic Feet Per Minute.
- Recirculates Room Air . . . 185 Cubic Feet Per Minute.

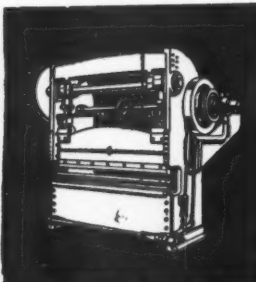
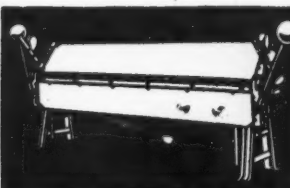
Every office, home, apartment is a prospect. No saturation . . . no trade-in allowances. And it's easy-to-handle package merchandise. Weighs only 26 lbs. Installation is quick, easy . . . a 30-minute, one-man job. Don't wait . . . get in early and cash in big! Mail the coupon today for full information.

* Price slightly higher Denver and West

Philco Radio & Television Corporation
Dept. No. 552, Philadelphia, Pa.
Please send me full details of your dealer franchise proposition on the new Philco Room Ventilator, with Discounts, Special Wholesale Credit Terms and literature.

Name _____
Street _____
County _____
City _____ State _____

CHICAGO

PRESS BRAKE HAND BENDING BRAKE
Steel Brakes—Presses—Shears
DREIS & KRUMP MFG. CO.
7404 LOOMIS BLVD. CHICAGO

The All Purpose....



**AIR
VELOCITY
METER**

INSTANTANEOUS
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SELL MORE FURNACES
with this NEW LOW PRICE



**Breuer's Ball Bearing
TORNADO**
Furnace and Boiler Vacuum Cleaner

Not only does it excel in furnace and boiler cleaning, but it puts you directly in touch with the furnace and repair needs of your customer. Not a converted household cleaner, but DESIGNED FOR THE JOB. Complete set of necessary attachments.

BREUER ELECTRIC MFG. CO.
5002 N. Ravenswood Ave. Chicago, Illinois

Ask for FREE SALES PLAN and Demonstration

**BETTER WORK—Faster with
Osborn Roofing Clips**



Special cone rivets are uniformly straight and tight fitting. Head rests on beam.

Oval shaped top fits up tight into corrugation.

Cadmium coated after forming. Made in two sizes—rivet projects 1/4" or 3/8" above clip. Ask your sheet metal distributor to show you an Osborn roofing clip or write us for a sample.

Flat under surface. Hook adjusts itself to any standard channel or I-beam.

THE J. M. & L. A. OSBORN COMPANY
1541 East 38th Street Cleveland, Ohio

Dingle—A Plan Of Accounts

(Continued from page 88)

eating up \$100.00 of the anticipated profits and the fault lies in the expense accounts. The sales, cost of sales and resulting gross profit were in full accord with the estimated program and yet overhead ran away with \$100.00 of the profits.

For the purpose of illustrating the most profitable combination of circumstances, we will assume the sales volume to be up \$500.00, the cost percentage to be normal, or 70%, and overhead expenses down \$100.00. That result would be:

(Illustration No. 5)

Gross Sales	\$ 3,000.00	100.00%
Cost of Goods Sold	2,100.00	70.00

Gross Profit	\$ 900.00	30.00
Overhead Expenses	400.00	13.33

Operating Profit..\$	500.00	16.67%
----------------------	--------	--------

Here, we have an operating profit of \$500.00, instead of the anticipated \$250.00, \$150.00 of which is due to increased sales volume, and the remaining \$100.00 is due to a decrease of that amount in the overhead expenses.

Looking at these several illustrations, from the customer's standpoint, you would have given the

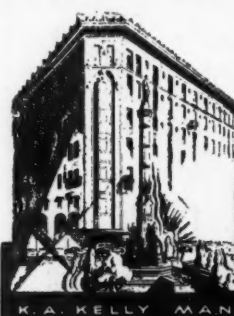
**ATTRACTIVE PROPOSITION—
ON THE NEW PEERLESS LINE**



The new Peerless line of coal, coke, oil and gas furnaces for manual or automatic firing, offers dealers an exceptional sales and profits opportunity. These new furnaces have "everything." Beauty, unusual efficiency, low operating costs. Many improved features including self-contained blower and filters. More perfect combustion. Model shown in illustration burns coal or coke. Ask for literature, prices and discounts to the trade. Write today.

PEERLESS FOUNDRY COMPANY
1853 LUDLOW AVENUE INDIANAPOLIS, IND.

Traveling Men Who Cover Buffalo Prefer This Well Located Hotel



Because it is right in the heart of the business and shopping district—because there is always a good room available—because the food is excellent.

RATES

Single	\$2.50 up
Double	4.00 up

Special rates for 4 or more.

Write for Folder I-10.

Hotel **LAFAYETTE**
K. A. KELLY, MANAGER BUFFALO, N.Y.

customer the same value for his money in illustrations 1, 2, 4, and 5, having given him material and labor costing you 70 for 100, yet, in Illustration No. 1 you had a net operating profit of 5%; in Illustration No. 2 you had a net operating profit of 13.34%; in Illustration No. 4, you had a net operating profit of 6% and in Illustration No. 5 you had a net operating profit of 16.67%. Looking at Illustration No. 3, you gave the customer goods and services costing you 80 for his 100, and just broke even. The customer actually received less for his money and you received no profit. From these several illustrations, we hope you will get the idea that there are several ways in which to make money out of your business and there are just as many ways to lose money.

The best way to exercise an intelligent control over your business operations is through a monthly operating statement, which will disclose to you the results of operation for that month and permit you quickly to ascertain the cause of any upset and take proper steps to correct the fault before it gets beyond your control.

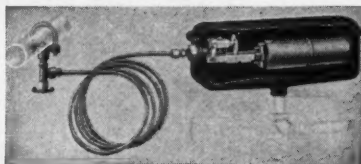
Good cost records are necessary before good operating reports can be prepared. Good records can not keep themselves. They are no better than your bookkeeper. *Good cost records plus a good bookkeeper produces a usable operating statement. A usable operating statement helps produce good operating profits.*

Tomorrow's humidifier valve today!

HERE'S the end of your humidifying troubles—a float valve with a new snap action that prevents plugging up or sticking open. Snaps open wide

when water drops 1/4-inch in pan; snaps to leak-tight closure against any water pressure when water level is restored. Has greater capacity—withstands high temperature—doesn't wire draw or corrode. Write for engineering data proving its superiority.

MCDONNELL & MILLER
1318 Wrigley Building, Chicago, Ill.



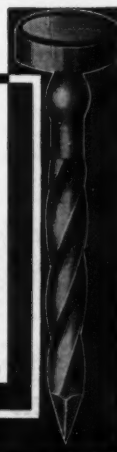
**The New
MCDONNELL
Humidifier
Water Control**

The "QUALITY" Nail!

DENISTON TRIPLE LOCK LEAD SEAL ROOFING NAILS

Look at it!... You can SEE the superiority of this nail! The lead, under the head and down the shank, plugs the hole around the nail with lead to form a weatherproof seal... the "bump" triple-locks nail, lead and sheet solidly together... when the nail is driven through sheet metal roofing, the drive screw shank gives greater holding power than any other nail. No loosened roofing, no leakage. Insure **QUALITY** roofing jobs with Deniston **QUALITY** Nails. Full details and prices, with samples and demonstrator blocks, **FREE**.

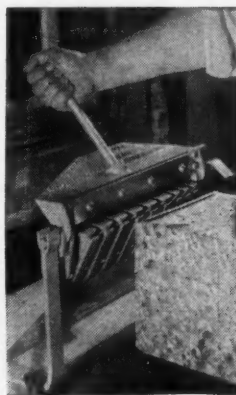
The DENISTON Co.
4856 SO. WESTERN AVE., CHICAGO



RYERSON CERTIFIED STEELS

LARGE STOCKS... IMMEDIATE SHIPMENT

Principal products include—Alloy Steels, Tool Steels, Stainless Steel, Hot Rolled Bars, Hoops and Bands, Beams and Heavy Structural, Channels, Angles, Tees and Zees, Plates, Sheets, Cold Finished Shafting and Screw Stock, Strip Steel, Flat Wire, Boiler Tubes, Mechanical Tubing, Rivets, Bolts, etc. Write for Stock List. Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.



Be **PROUD** of your
WORKMANSHIP
and make
MONEY too!

SMITH'S CLEAT BENDER will make **PERFECT** Drive Edges on the ends of square pipe, and make **PERFECT** Cleats to join them together. —See your Dealer, or write—

R. E. SMITH
1521 Garden Place
Waukegan, Ills.

SPOT WELD WITH AN ACME "Hot Spot" WELDER

Proven utility for over 25 years in thousands of sheet metal fabricating plants.

Write for Literature and Prices.
Complete Range of Sizes
Lifetime Guarantee!

ACME ELECTRIC WELDER CO.
5619 Pacific Blvd. Huntington Park, Calif.



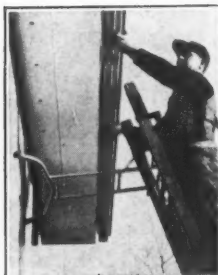
PORTABLE SHEARS ALL-ALLOY



ALL-ALLOY No. 2 cuts up to 1/4" steel plate.
ALL-ALLOY No. 1 cuts up to No. 11 gauge strip or sheet.
Special blades may be had for shearing stainless steel.

FULLY GUARANTEED
BREMIL MFG. CO. Erie, Pa.

AMERICAN ARTISAN Service Section



KWIK-WAY LADDER BRACKET

Adjustable—
Light—Strong—
Safe. Attached
in 10 seconds.
Sheet Metal
Workers—here

is THE solution to your gutter hanging problems. It offers a practical method of holding ladder from edge of eaves. Indispensable on buildings with wide roof projections. Quickly pays for itself through time saved. Allows one man to hang long lengths with ease and safety. Eliminates carrying various length ladders to job. Write today for prices and literature describing many other uses.

MYERS LADDER EQUIPMENT CO.
3121 Buena Vista, Madison, Wisconsin

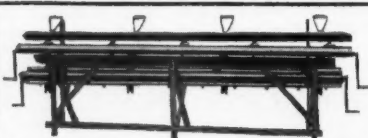
BLOWERS — FANS — EXHAUSTERS

THOROUGHLY REBUILT, for perfect performance. All types; all standard makes. All sizes including the big ones. Hundreds in stock, meeting all requirements. Attractive prices. Fully guaranteed. Expert engineering counsel. **GENERAL BLOWER CO.,** Engineers, 403 North Peoria Street, Chicago, Illinois.

CUSTOM FABRICATION OF ALL ALLOYS STAINLESS-MONEL-COPPER, ETC.

Custom fabrication of all alloys with satisfaction guaranteed. Send blueprints for prices and delivery. Years of experience guarantee responsible and accurate work. **TERMS CASH WITH ORDER.** Write today for further information.

RIESTER & THESMACHER COMPANY
SHEET METAL PRODUCTS
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The Electric City Gutter Former

MAKE YOUR OWN GUTTER AS YOU WANT IT
Easily and quickly operated. Soon pays for itself.

REPLACEMENTS

Beading Rods, Handles, Rolls, etc., quickly furnished.

STERLING BEADER

A simple and inexpensive machine for forming round bead.

F. L. ROBERTSON

56 RAND STREET BUFFALO, N. Y.

Prove Your Service with this \$18 Temperature Recorder

Test installations...
Locate trouble...
Prove efficiency and
end complaints this
easy, accurate Prac-
tical way. Records
temperature any-
where, in ink, on per-
manent 24-hour
chart. Guaranteed.
Order from your
supplier.



Write for Bulletin D

PRACTICAL INSTRUMENT CO.
2717 N. Ashland Ave. Chicago



Save Money, Time and Muscle

Drill Concrete with the "Do-All" Combi-
nation Electric Hammer and Drill. Set expansion
bolts 10 to 20 times faster than with hand tools.
Drills concrete, brick, stone, metal, wood. 3 tools
in 1. Easy to maintain—Pays for itself. Bulletin
No. 381.
WODACK ELECTRIC TOOL CORPORATION
4644 W. Huron St., Chicago, Ill.



*Deep in the
Old South*
A MODERN HOTEL
The
CLARIDGE

The traditional hospitality of Dixie is perpetuated at
the Claridge, where nothing grows old—where the
charm of the South and the march of progress are
blended into a delightful atmos-
phere. New rooms. Excellent
location. Popular Coffee Shop.

FROM \$2.50

MEMPHIS
TENNESSEE



Visit the Sensational New
BALINESE ROOM

**"CHECK IN AT
DEWITT OPERATED
HOTELS"**



In Cleveland
HOTEL HOLLENDEN

In Columbus
THE NEIL HOUSE

In Akron
THE MAYFLOWER

In Lancaster, O.
HOTEL LANCASTER

In Corning, N. Y.
BARON STEUBEN HOTEL

THEO. DeWITT
President

R. F. MARSH
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& Gen. Manager



THE HOTELS THAT CHECK WITH EVERY TRAVEL STANDARD

Classified

SITUATIONS OPEN

WANTED: Advertising Manager with knowledge of warm air furnaces, Air Conditioning, Oil Burners, Stokers; man capable of handling all advertising copy and sales correspondence. Give age, salary expected and references in first letter. Position is open at this time with mid-western furnace manufacturer. Address Key No. 527, American Artisan, 6 N. Michigan Ave., Chicago.

NEW PROFITS FOR MANUFACTURER'S AGENTS. Territories now open to Manufacturer's Agents—representing the nationally recognized line of "RESEARCH" Air Filters to manufacturers and wholesalers of heating and ventilating equipment. Only agents with experience, who are established in territory will be considered. Territories open in Texas, New Mexico, Nevada, Utah, Nebraska, North Dakota, South Dakota, Alabama, West Virginia, Eastern Pennsylvania, Upper New York and New England. Address inquiries to Research Products Corp., Madison, Wis.

WANTED—Experienced Sheet Metal Estimator Contact David C. Jones, 537 Ceres Avenue, Los Angeles, California. In answering state qualifications and experience.

WANTED—Sheet Metal Foreman, capable of taking complete charge of job shop doing general building sheet metal work. Permanent position. State experience, training and references. Address Key No. 529, American Artisan, 6 N. Michigan Ave., Chicago.

SITUATIONS WANTED

SALES EXECUTIVE—Desires to make a change. Thorough knowledge of and many years' experience in Warm Air Heating and Air Conditioning. Ability to teach Engineering Schools in Warm Air Heating and Air Conditioning. Sales Promotion and a proven sales record which will stand a most rigid investigation. Have exceptionally wide acquaintance and following in the trade and industry. If you are interested in a sales executive who can guarantee to produce results, please communicate with Key No. 528, American Artisan, 6 N. Michigan Ave., Chicago.

FOR SALE

For Sale—Old established Sheet Metal Heating Business. Complete set of Tools and good stock. Present owner has occupied same building for thirty-three years. Reason for selling, age and ill health. Address J. R. Everroad, Columbus, Indiana.

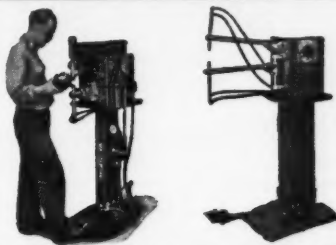
A-1 equipped Sheet Metal business, established for 43 years in same location. Installed 50 heating plans in 1940. Lot of Camp Grant business. Golden opportunity for right party. Don't write unless you mean business. Address Key No. 530, American Artisan, 6 N. Michigan Ave., Chicago.

WANTED

Wanted one 4 foot brake-in A-1 condition. Address The Novak Heating Co., Cedar Rapids, Iowa.

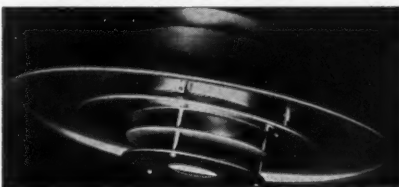
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AMERICAN ARTISAN Service Section



Electric welding equipment of every description to weld from a watch case to a door. Special or standard SPOT WELDERS from ¼ to 500 K.V.A. A.C. Arc Welders from 100 to 400 Amps. We invite contract Spot Welding in large or small quantities.

EISLER ENGINEERING COMPANY
CHAS. EISLER, PRES.
761 S. 13th St. (Near Avon Ave.) Newark, N. J.



KNO-DRAFT
MODEL SR AIR DIFFUSER

★ Spun Aluminum ★ Union Made

Write—**Plandaire, Inc.**
7350 Oakland Station, Pittsburgh, Pa.



Extra!

Contains descriptions of one of America's largest stock of New, Used, and Rebuilt Machinery for Metal Fabricating and Structural Steel, Sheet Metal Machinery, Production Machinery, and Machine Tools.

INTERSTATE'S LATEST CATALOG 404—FREE!
Completely indexed. Over 200 illustrations — Handsomely Printed — Durable Bound for permanent reference. Describes OVER 2000 machines in stock ready for IMMEDIATE SHIPMENT!

INTERSTATE MACHINERY CO., INC.
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JOHNSON'S
NEW HANDY MANUAL
on
HEATING, VENTILATING
MECHANICAL REFRIGERATION
and
AIR CONDITIONING

432 pages of practical, condensed information, tables, rules and diagrams. Price \$1.00—Remit with order to

KEENEY PUBLISHING COMPANY
6 N. Michigan Ave., Chicago, Ill.

Use **AMERICAN ARTISAN Classified Advertising** for quick results. It puts you in direct touch with the buyers and sellers in the warm air heating, sheet metal contracting and air conditioning industry.

SODER STAINLESS STEEL RAPIDLY



- ALLEN Stainless Steel Soder
- ALLEN Stainless Steel Flux
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Send your letterhead for **FREE SAMPLES** and Booklet.

L. B. ALLEN CO., Inc.
6702 Bryn Mawr Chicago, Ill.

• LOCKFORMERS •

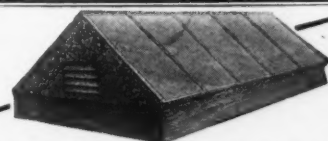
Sheet Metal Fabrication Machinery
Chicago Steel Bending Brakes
Spot Welders—Whitney Tools
Pexto Power and Hand Equipment
Electric Tools—Small Shop Tools
Sheet Metal and Ventilation Supplies

FRED E. MILLER N. A. LINDVALL

"Always Ready to Serve You"

CENTRAL - WEST MACHINERY CO.
(Not Inc.)

Tel. Haymarket 8361 335 S. Western Ave.
Chicago, Ill.



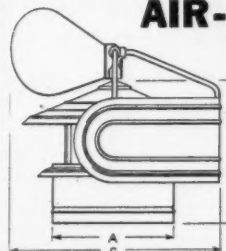
WILLIS' DOUBLE PITCH SKYLIGHT with VENTILATOR

Another quality-built item quickly and easily assembled to make a complete job. Ventilator in gable end designed to open and close at will. Ventilator can be installed in ridge if desired. Constructed in any size desired. Write today for catalog.

WILLIS MFG. COMPANY
Galesburg, Illinois

AIR-A-WAY

REVOLVING VENTILATORS



- Exceptional Air Removal
- Simple, Sturdy Construction
- Low Selling Price
- Completely Open-Throat

NO Down Draft Hot Air Pockets Water Leaks

Write Today for Catalog

American Metal Products Co.
Sylvania Sta., P. O. Box 66 Ft. Worth, Texas

13c RIBBED WIRE GLASS 1/4"

13c per sq. ft.—Plus Boxing f.o.b. our warehouse
STOCK SHEETS—CASE LOTS
Reasonable freight rates to all parts of U. S. A.
Salesmen wanted for several territories.
Cut sizes—2c per sq. ft. additional.
PROMPT SHIPMENTS—GOOD QUALITY
T. J. ATCHESON GLASS CO. 955 MAIN ST.
Buffalo, N. Y.—U. S. A.

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WAGNER MOTORS

are correctly engineered for every type of air-conditioning equipment—

No matter what type of air-conditioning equipment is involved . . . whether large or small . . . regardless of the torque, speed or current requirements, you can choose a motor from the Wagner line that is correctly engineered for the job. The 8 motors illustrated represent the types of Wagner motors most frequently used in air-conditioning work. Each motor has special electrical or mechanical characteristics that make it the ideal motor for certain applications.

TYPE RK, CAPACITOR-START INDUCTION-RUN motors are suitable for driving refrigerators, household air conditioners, and other appliances. Drip-proof or totally-enclosed endplates; rigid or resilient mounted; 1/8 to 3/4 hp.

TYPE RA, REPULSION-START-INDUCTION motors are single-phase brush-lifting motors having high starting-torque and low starting-current. The ideal motor for heavy duty applications such as stokers, compressors, pumps, etc. Obtainable in various speeds, frequencies, and voltages; rigid or resilient mounted; 1/8 to 15 hp.

TYPE RS, WOUND ROTOR (SLIP-RING) motors have adjustable varying speeds and combine the ability to start extremely heavy loads with good running characteristics. Smooth starting and adjustable varying speeds are effected by the use of external resistors. 1 to 250 hp.

TYPE M, SHADED POLE FAN motors are single-phase induction motors of simple construction. Ideal for fan and blower drives in which the fans are mounted directly on the motor shaft. Totally-enclosed and open-type; rigid or resilient mounted; 1/250, 1/125, 1/80, 1/40 and 1/30 hp.

TYPE TB, SPLIT-PHASE UNIT HEATER motors are totally-enclosed to prevent entrance of dust or moisture; ball-thrust bearings on front end to take care of end-thrusts imposed by fans; rubber mounted for ultra-quiet operation. 1/20 to 1/4 hp.

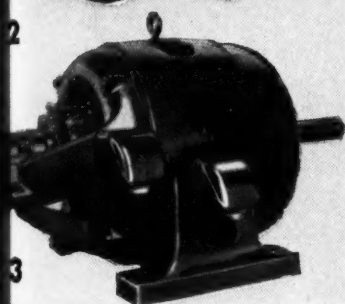
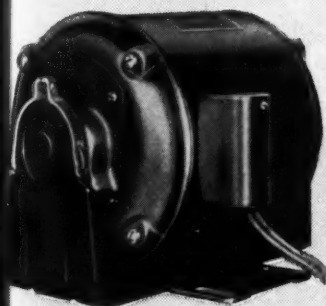
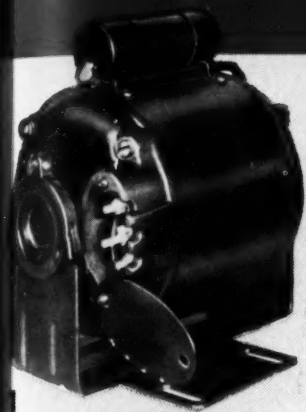
TYPE RP, SQUIRREL-CAGE motors are made in 7 electrical types varied as to torque and current characteristics to take care of a wide variety of applications. 2 and 3 phase; 1/6 to 400 hp.

TYPE RD, DIRECT CURRENT motors may be used for direct current service wherever repulsion-start-induction, split-phase, capacitor, or squirrel-cage motors would be used for alternating current service. Built in two types: Appliance type up to 1 1/2 hp; Industrial type, 2 and 3 hp.

TYPE RT, SPECIAL COMPRESSOR motors were developed to meet the demand for a motor with high starting-torque and very low starting-current. The RT motor is ideal for large compressors. The very low starting-current permits across-the-line starting. 2 and 3 phase; 40 to 100 hp.

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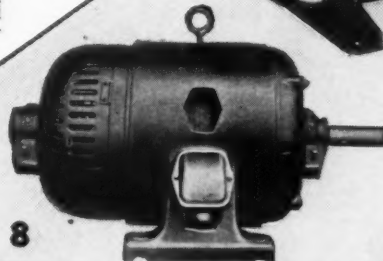
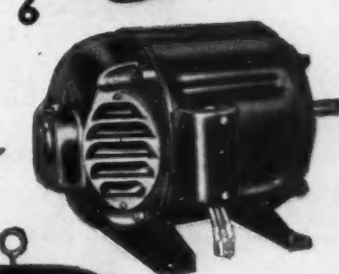
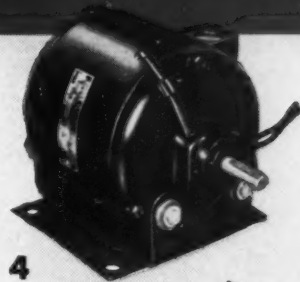


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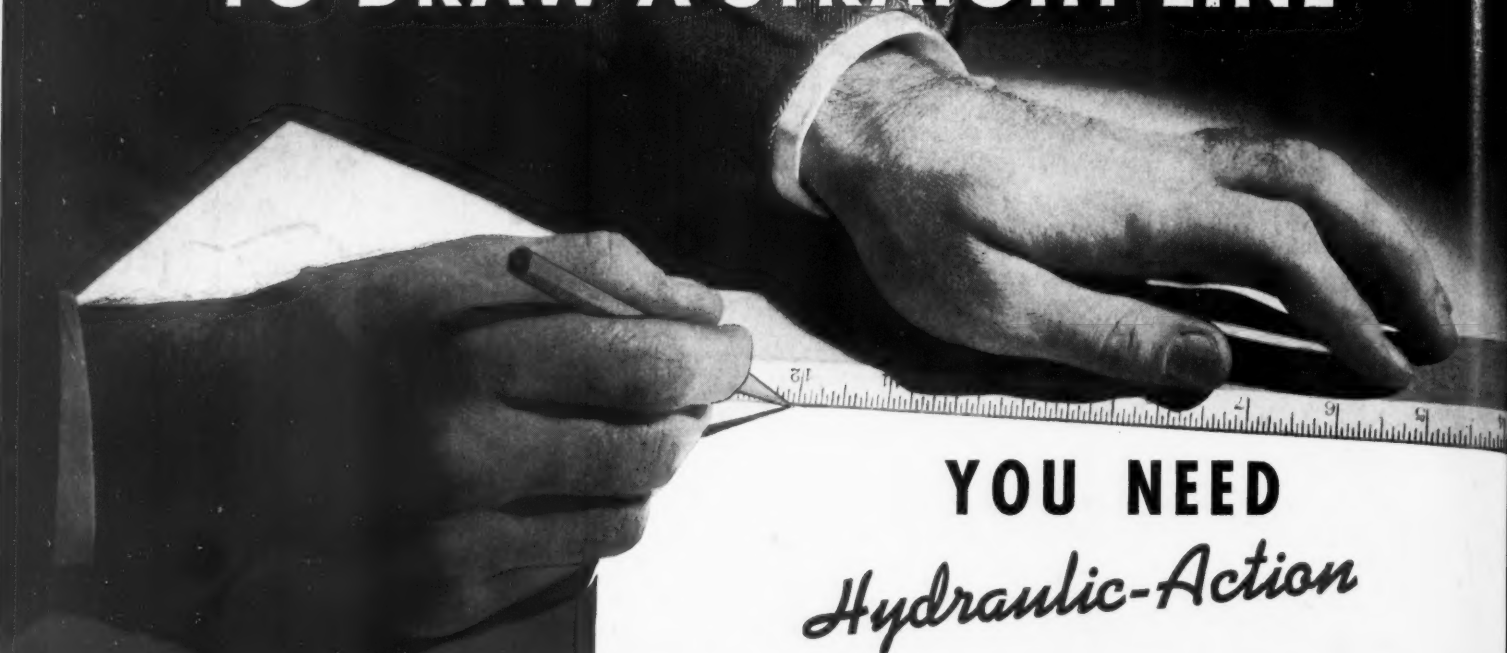
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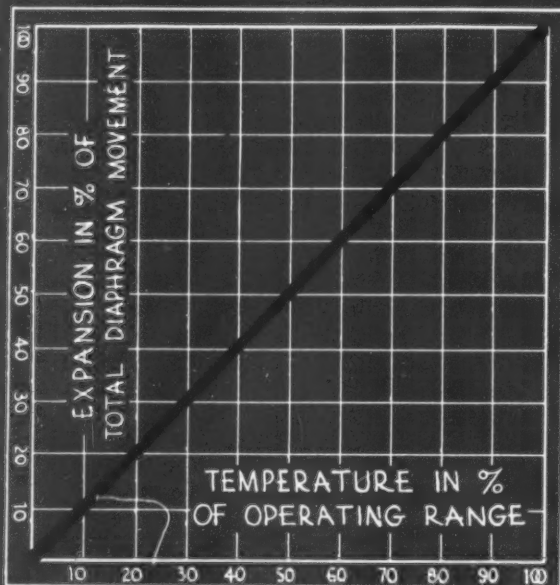
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